

GENERAL LIBRARY

APR 29 1919

UNIV. OF MICH.

Railway Age

FIRST HALF OF 1919—No. 17

NEW YORK—APRIL 25, 1919—CHICAGO

SIXTY-FOURTH YEAR

Published weekly by Simmons-Boardman Pub. Co., Woolworth Bldg., New York, N. Y. Subscription Price, U. S. and Mexico, \$5.00 a year; Canada, \$6.00; foreign countries (excepting daily editions), \$8.00. Entered as second-class matter, January 30, 1918, at the post office at New York, N. Y., under the act of March 3, 1879.

Buy Victory Bonds!



The Service is Judged by the Results It Produces

We know of no instance where the TATE FLEXIBLE STAYBOLT was specified and used in new locomotive boilers, or for firebox renewals, but that the greatest mileage and the lowest cost of firebox maintenance was invariably obtained throughout actual road service.

When a staybolt has once been tried and tested, and has given good service, it does not pay to change for a cheaper or like article, only for experimental purposes.

Results have invariably shown that it is far better to continue the use of the TATE FLEXIBLE STAYBOLT than to try out some new substitute that is unknown.

SPECIFY "TATE" FLEXIBLE STAYBOLTS for all new equipment and firebox renewals.

IN USE ON MORE THAN 650 RAILROADS

FLANNERY BOLT COMPANY
MANUFACTURERS, PITTSBURGH, PA.

GENERAL OFFICES: VANADIUM BUILDING, B. E. D. STAFFORD, GENERAL MANAGER
J. ROGERS FLANNERY & CO., SALES AGENTS, VANADIUM BUILDING, PITTSBURGH, PA., U. S. A.
GEO. E. HOWARD, EASTERN TERRITORY COMMONWEALTH SUPPLY CO., SOUTHEASTERN TERRITORY
W. M. WILSON, WESTERN TERRITORY



The long-wearing, rich-appearing upholstery material—inexpensive and distinctive.

L. C. CHASE & CO., Boston
NEW YORK DETROIT SAN FRANCISCO CHICAGO

The standard upholstery for over a third of a century—grades for all uses.

CHASE
Goat Brand
Car Plush

Chicago-Cleveland Car Roofing Company

MANUFACTURERS OF STEEL ROOFS AND CARLINES FOR FREIGHT CARS

535 RAILWAY EXCHANGE BUILDING Michigan and Jackson Boulevards CHICAGO



GOLD'S VAPOR SYSTEM WITH No. 1112 VAPOR VALVE

For Application Inside of Car.

POSITIVELY WILL NOT FREEZE.
ABSOLUTELY FOOL-PROOF.
NO ADJUSTMENT WHATEVER
REQUIRED.
ECONOMICAL IN STEAM.
SMALL AND LIGHT IN WEIGHT
ALL PARTS ACCESSIBLE
CHEAPER TO INSTALL AND
MAINTAIN.

WRITE FOR CIRCULAR.

GOLD CAR HEATING & LIGHTING CO.
17 BATTERY PL. (Whitehall Bldg.) NEW YORK
Manufacturers of Complete Car Heating and Ventilating Apparatus



AIR REDUCTION COMPANY, INC.

HOME OFFICE 120 BROADWAY N.Y.C.

WELDING AND CUTTING APPARATUS

CALCIUM
CARBIDE

OXYGEN

NITROGEN



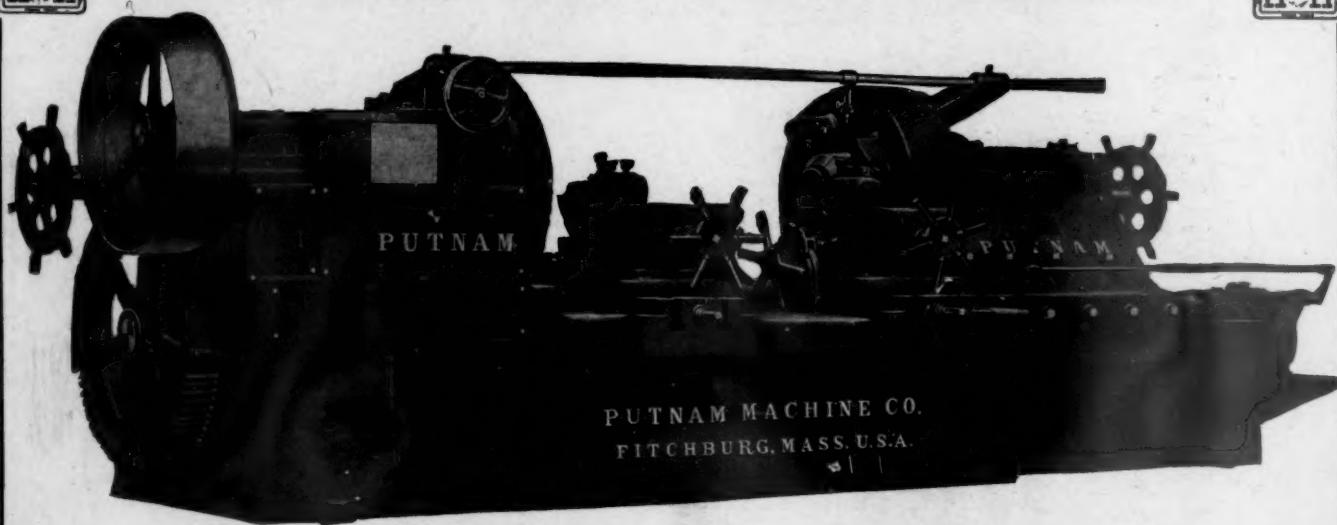
ACETYLENE
GENERATORS

ACETYLENE

WELDING RODS



Putnam Latest Pattern 42" Coach Wheel Lathe



PUTNAM MACHINE CO.
FITCHBURG, MASS. U.S.A.

All Steel Gearing.
Heaviest and strongest built.
Belt or motor driven as desired.

Combination Tool Holder.
Putnam Driving Dogs.
Automatic Tailstock Binding device.

MANNING, MAXWELL & MOORE

INCORPORATED

119 West 40th Street, New York

MACHINE SHOP AND FOUNDRY EQUIPMENT OF EVERY DESCRIPTION

Boston, Mass.
Buffalo, N. Y.
Chicago, Ill.
Cincinnati, Ohio

Cleveland, Ohio
Detroit, Mich.
Mexico City, Mex.
Milwaukee, Wis.

New Haven, Conn.
Philadelphia, Pa.
Pittsburgh, Pa.
St. Louis, Mo.

San Francisco, Cal.
Yokohama, Japan



EDITORIAL

Railway Age

EDITORIAL

Open Cincinnati Office

On Monday, April 28, the Simmons-Boardman Publishing Company, publishers of the *Railway Age*, will open an office in the First National Bank Building, Cincinnati, Ohio. It will be in charge of R. H. Smith, a member of the business staff formerly connected with our Chicago office, who will look after the interests of the Simmons-Boardman publications, including the *Railway Age*, *Railway Mechanical Engineer*, *Railway Maintenance Engineer*, *Railway Signal Engineer*, *Railway Electrical Engineer* and the *Locomotive and Car Builders' Dictionaries*.

Hereafter concerns selling supplies to the railways will be able to pay commissions, or, as they are technically called,

Contingent Fee Covenant Modified

"contingent fees," to bona fide agents employed under a general contract without invalidating their contracts with the railways. This is the result of an order recently made by Director General Hines. On June 18, 1918, the Department of Justice issued an order requiring that thereafter there should be inserted in every contract of purchase made by any government department a covenant stipulating that the concern from which the purchase was made would not pay a commission or fee to any agent as compensation for having made the sale to the government. This was not the exact language of the covenant, but was its substance and effect. The insertion of this covenant in all contracts between the railway equipment and supply companies and the railways, if permanently continued, would have forced many supply concerns radically to change business methods which had been used for years and would have driven not a few out of business. It had been a common practice for railway supply manufacturers to sell goods through agencies which were constituted regular representatives and whose compensation took the form entirely of commissions based upon the amount of goods they sold. The commission method of doing business would have had to be abandoned if the covenant drawn up by the Department of Justice had had to be inserted in all contracts. The result would have been that the equipment and supply companies would have had to make all sales through salaried agents. This would have increased their selling costs and either reduced their profits or rendered it necessary to charge the railways higher prices. The covenant was manifestly adapted to doing almost no good and much harm. It will continue to be inserted in contracts, but in appropriate cases there will be added a proviso to the effect that it "shall not invalidate a contract obtained through a bona fide commercial representative employed under a general contract covering designated territory and shall not prohibit or penalize the employment of the same agency methods and rates of compensation" which have heretofore been "customarily employed by the contractor in the regular course of his business in similar dealings with the railroad corporations." This seems to dispose of a matter which has caused much vexa-

tion of spirit and not a little expense to the railway supply companies. The negotiations which have led to this satisfactory outcome were conducted by the Railway Business Association which, as well as the director general of railroads, deserves credit for having secured a settlement on a common sense basis.

The effect upon the members of the New York Railroad Club of the moving pictures which have been used in the fuel conservation work on the Northern Pacific and which were shown by Fuel Supervisor M. A. Daly at the meeting of the club last week, was indeed remarkable.

The Movies and Fuel Conservation

At first thought it is difficult to see how moving pictures can be used to show up the advantages and disadvantages of different methods of firing and the effects of wastefulness and carelessness in the operation of the locomotives and the handling of fuel. With the help of a skilful expert in the art of taking moving pictures, however, the Northern Pacific has developed a series of films that clearly show these effects and leave a deep and lasting impression on the mind which could hardly be produced in any other way. The moving pictures combined with the fuel instruction car which has been developed along lines which are unique and different from those used by any other road have, beyond question, been responsible for the splendid showing that the Northern Pacific has made in its fuel performance as compared with other roads operating under more or less similar conditions. The testimony of the fuel supervisors who took part in the discussion of Mr. Daly's address indicate a deep-seated belief in the fact that the average man takes a real pride in doing his work well; the difficulty in railroad service where the men are scattered and the problem of supervision is difficult, is to keep in sufficiently close touch with them to know that they understand exactly what is expected of them and just how their tasks should be performed. In no other field is the educational problem of greater importance than among the operating men on the road. Likewise the difficulty of reaching these men is equally great and exceptional methods must be taken if real results are to be obtained. The fuel instruction car on the Northern Pacific, with its simple and yet forceful lectures including practical experiments and demonstrations, taken in conjunction with the movies, should be studied by all those who are interested, not alone in fuel conservation but in educational work along other lines.

For months a dispute as to wages and length of working day has been dragging on between the workers in New York harbor and the owners of tugs and barges.

The Turning of the Tide

Two arbitrations failed to settle the matters in controversy, but, as a result of the second of these arbitrations, the Railroad Administration granted the eight-hour day to employees on its tugs and barges and the men agreed to return to work. The independent boat owners, however, refused to grant the eight-hour day but effected a settlement with one of the unions involved. The inde-

pendents are largely owners of barges—coal, wheat, etc. It appeared that through the agreement with the rival union the independents were in a fair way to win in the strike which had been declared by the Marine Workers' Affiliation (the union with which the Railroad Administration made its settlement). The barges of the independent owners depended largely upon the tugs of the Railroad Administration to move them about the harbor but when the Marine Workers' Affiliation saw how things were going, they ordered crews of the Railroad Administration tugs to refuse to handle independent boat owners' barges. This was the cause of the trouble which was ended by the men agreeing to go back to work for the independent boat owners with a ten-hour day. The wage question was left to future arbitration. This is, apparently, a defeat for the Marine Workers' Affiliation and is a successful outcome to the policy pursued by A. H. Smith, director of the Eastern region, in his handling of the dispute. It is true that the Railroad Administration granted the eight-hour day to its employees, whereas the success of the independent owners has demonstrated that a ten-hour day is not considered unreasonable by the men; but the encouraging feature about the strike is that it was handled, in regard to the administration's tugs in New York harbor, by the regional administration, not by the central administration in Washington, and that the regional administration stuck to its guns and won its point without making concessions. Needless to say, its case was perfectly clear-cut and the refusal of the Marine Workers' Affiliation to carry out the terms of an agreement so recently made left it without the power to greatly confuse the issue.

Maintaining Wages and Reducing Prices

SINCE THE SIGNING of the armistice it has been the policy of the government to try to maintain wages in industry while securing reductions of prices. In attempting to carry out this policy it has been given the support in public utterances of many labor leaders, public men and business men. It cannot be said that as yet the policy has been notably successful. There have been some slight reductions in wages and some larger reductions of prices. On the other hand, there have been some advances in prices. Generally speaking, both wages and prices have been maintained. One of the principal results has been that in most lines of industry business men, hoping for larger reductions in prices, have refrained from entering upon large new projects and that the business of the country has slumped. There is no better barometer of general business conditions than the amount of freight being moved by the railways. The volume of freight traffic has greatly declined.

There is naturally much skepticism in some quarters as to whether the policy of trying to maintain wages and at the same time reduce prices will be successful. If it is not successful it will in the long run do more harm than good. As to the maintenance of wages this is desirable, if it can be done. But wages are a very large part of the cost of production in every industry. There are only two ways in which wages generally can be maintained and prices reduced. The first is for business concerns to forego part of their profits. The second is to secure greater efficiency in production. As to the first, business men naturally will not make large reductions in their profits if they can avoid doing so. As to the second, increased efficiency means a greater output in proportion to the amount of materials used and the number of men employed, and unless the co-operation of labor can be secured it is extremely difficult to get improved results from either the material or the human elements in production.

As a matter of fact, no really large reduction of prices can be obtained merely through reduction of the profits of industry. Large reductions in prices, if they are to be obtained while wages are maintained must be secured by means of increased efficiency in production. Unfortunately, present-day labor generally seems to be almost as strongly indisposed to co-operate in securing increased efficiency of production as to accept reductions of its wages. This is one of the greatest obstacles to general reductions of prices. It is also the one obstacle regarding which the governmental authorities who are urging the maintenance of wages, the reduction of prices and the practice of "Buy it now," are maintaining the deepest silence. In Great Britain, where labor conditions are far more unsatisfactory than in the United States, and the trade unions are stronger, the leading statesmen, with Lloyd George at their head, are constantly emphasizing in their public utterances the need and duty of labor to co-operate with the employers in maintaining and increasing efficiency of production. Our public men at Washington are showing the same want of statesmanship and courage in dealing with this phase of our reconstruction problem that they are showing in dealing with most other phases of it.

Terms of the Victory Liberty Loan

ANNOUNCING THE DETAILS of the Victory Liberty Loan, Carter Glass, secretary of the treasury, stated that there will be no more popular subscription loans floated in the United States. War debts will continue to pile up as long as it is necessary to keep the army of occupation in the provinces along the Rhine, and until the troops already returned to this country are demobilized and the country takes up again the works of peace. But other means of financing will be found by the treasury department to meet these demands of the future. In outlining the purpose of the department in making this final appeal to the people for support, Mr. Glass said:

"In fixing the terms of the issue, the treasury has been guided largely by the desire to devise a security which will not only prove attractive to the people of the country in the first instance, but the terms of which will insure a good market for the notes after the campaign is over and identical prices for the two series, and should not affect seriously the market for the existing bonds of the Liberty Loans. This will be the last Liberty loan. Although as the remaining war bills are presented further borrowing must be done, I anticipate that the requirements of the government in excess of the amount of taxes and other income can, in view of the decreasing scale expenditure, be readily financed by the issue of treasury certificates from time to time as heretofore, which may ultimately be refunded by the issue of notes or bonds without the aid of another great popular campaign such as has characterized the Liberty Loans.

"I am sure that the people of America will subscribe to this Victory Loan in the same spirit of patriotism which they have shown in the past to the end that the notes may be distributed as widely as possible and that our great banking institutions may be left free to supply the credit necessary for the purpose of industry and commerce and the full employment of labor. Let the world see that the patriots of America out of their boundless resources, and with the same enthusiasm and devotion to country with which they prosecuted the war to a victorious conclusion, are determined to finish the job."

The *Railway Age* presents herewith details of the new Victory Loan, and terms of payment as outlined by the government. The amount of the loan was fixed at \$4,500,000,000, instead of \$6,000,000,000 as was anticipated in many

circles. The loan is in the form of two series of gold convertible notes, one bearing 4 3/4 per cent interest, exempt from state and local taxes, except estate and inheritance taxes, and normal income taxes; and the other bearing 3 3/4 per cent interest, exempt from all taxation except estate and inheritance taxes. The notes are for a term of four years, but may be taken up by the government at the end of three years by payment of the par value with accrued interest.

Either form of note is convertible into the other at the option of the holder. Interest is payable semi-annually on December 15 and June 15 after December 15, 1919. No over-subscription will be accepted, but all subscriptions up to \$10,000 will be allotted in full.

The government's terms of payment are 10 per cent with the subscription prior to May 10, when the campaign closes; 10 per cent, July 15; 20 per cent, August 12; 20 per cent, September 9; 20 per cent, October 7, and 20 per cent, November 11.

Although this is the last call of the government upon the people for a popular war loan, the raising of this money is just as important as were any of the Liberty Loans. The government needs the money for the payment of a myriad of war bills that accumulated during the last few months of the war, and to keep the finances of the country in such a condition that industry will not be crippled, and the chance at the world trade lost.

Progress in Water Treatment

THE HISTORY of the introduction and development of water treatment on American railroads not only is a fascinating story filled with human interest, but it also constitutes a lesson regarding the need of proper appreciation and practical application of scientific discoveries, that may be applied with equal propriety to many other phases of railway operation. Water softening on railroads received its first real impetus about 20 years ago, through the enthusiastic zeal of a few energetic engineers and chemists who understood the wonderful possibilities in the simple chemical transformation involving the use of two cheap reagents, lime and soda ash. Through their efforts the practical value of treating locomotive water supplies was demonstrated beyond question, and during 1904, 1905 and 1906 current technical literature was replete with expositions of the value of water softening, fully demonstrated by records of savings in boiler repairs, flue and sheet renewals, fuel economies and reductions in engine failures.

Then followed a lull in the advancement of this improvement of railway water supply. The subject was less frequently discussed and the occasional references brought to light from time to time were as often derogatory as otherwise. There was also talk of treating plants that had been taken out of service here and there.

This was the state of affairs when in 1913 the Water Service committee of the American Railway Engineering Association was instructed to "report on water treatment and the results of study being made of water softening from the operating standpoint." In the ensuing investigation, the committee discovered that a few roads which had undertaken water treatment some years before were not only thoroughly convinced of the advantages accruing from these installations, but were obtaining increased benefits from year to year as the more intimate details of the subject were better understood. However, the most profitable phase of this investigation was the study of those cases where the use of water softeners had been discontinued or was being considered with disfavor. This disclosed the fact that the failure of these plants to produce the desired results, arose in nearly all cases from one essential defect—inadequate supervision, not only in the

operation and maintenance of the plants, but in making the installations in the first place.

The chemistry of water softening is simple. Nevertheless, the operation of a battery of plants treating a variety of waters, some of which change in composition from day to day, presents a problem of no mean proportions. It entails the exercise of both engineering and chemical knowledge, and like any other technical branches of railroading, it must be managed by one who knows his business and who is clothed with adequate authority to put his knowledge into effect. The particular importance of this in the case of water softeners arises from the fact that the successful treatment of water and the efficient use of the treated water in the locomotives requires co-operation on the part of all that have anything to do with the operation and maintenance of the plants and the operation of the locomotives. Consequently, the water treatment must be under the general supervision of a man who is able to inspire confidence in the system of water treatment he is handling, on the part of all those directly or indirectly concerned.

During the last four years water softening has received a renewed impetus, with the result that there have been repeated demonstrations of its economic value wherever the railroads have approached this subject with an adequate conception of the essentials for success. One of the best demonstrations of the results obtainable when it is prosecuted under a comprehensive plan with proper control will be found on another page of this issue where a report is given of the results secured on the Great Northern during the last seven or eight years. The special lesson of this report lies in the demonstrated value of close supervision of the minute details of plant operation. It also illustrates the advantage of water treatment covering a complete area, as compared to a "hit-or-miss" plan under which only the most objectionable waters are treated. The article will be found of interest alike to the student of water treatment and to the operating or mechanical officer who is concerned only with results.

Senator Cummins on the Railroad Problem

THE VIEWS OF SENATOR CUMMINS of Iowa upon the railroad problem have become of great importance. He is now the ranking Republican member of the Senate Committee on Interstate Commerce and doubtless will be elected its chairman when Congress meets. Therefore, he will have a leading part in framing the important railway legislation which probably will be enacted this year. Senator Cummins recently delivered an address on the railroad problem before the General Assembly of Iowa, which we publish in this issue.

For some years the Iowa senator was a severe critic of the management of the railroads of the United States. He seemed inclined to favor government ownership. He is now, as his address shows, strongly opposed to government ownership—or, at least, to government management. He still believes that the system of management and government regulation existing before government control was adopted resulted in wastes and abuses; and he is in favor of returning to private operation under a different system.

The principal shortcomings of the old system of regulation were, first, the conflicts between state and federal regulation; second, the way in which it dealt with competition; third, the way in which it dealt with the return upon capital. Senator Cummins has come "slowly and reluctantly" to the conclusion "that in so far as the rates are concerned the national government must be the arbiter." He is in favor of competition between strong roads, but would have the railroads consolidated into not more than eighteen large

systems in order that the extremely unequal competition between the strong and weak roads which has rendered it impossible intelligently and fairly to regulate rates shall not be revived. Thus far most students of the subject who are in favor of private management will be able substantially to agree with him.

The most important feature of his plan, however, is that which relates to the regulation of the return to be earned by the railways. Regarding this part of it there will be sharp differences of opinion between those who favor and those who oppose government guarantees of net return. He would have a government corporation acquire all the railway properties or all the securities and substitute new obligations. After effecting the needed consolidations, he would turn the properties over to the ownership and operation of private companies. He would have the government guarantee a return of 4½ per cent upon the new securities, which would be based upon some kind of a valuation.

The execution of this plan would involve virtually a complete change in the ownership of all the railroads. The transaction would be the most enormous in history. The details to be worked out would be inconceivably intricate and numerous. Even if this part of the plan were practicable, it would seem that it would take years to carry it out. Meantime, the railroad situation would be wholly unsettled, and it is hard to see how any progress could be made in securing the improvement and expansion of railway facilities which is now needed.

Senator Cummins assumes, without conceding, that the value of the properties is \$17,000,000,000. He says that a government guarantee of 4½ per cent, or \$765,000,000 a year, on this would be "ample"—doubtless meaning it would be ample to keep the securities at par. He adds, "The people paid in 1917 a (railway) capital charge of a billion dollars. * * * The principle I have proposed, if embodied in the law, will save the people of the country from \$250,000,000 to \$500,000,000 annually." Senator Cummins' reasoning at this point is open to destructive criticism. It is wholly improbable that the value of the railways would be found to be as small as \$17,000,000,000. Even if it were, and the government guaranteed 4½ per cent on it, the saving in capital charge would be nowhere near as large as he estimates. The year ended on June 30, 1916, is the last for which we have complete statistics of the Interstate Commerce Commission. By "capital charge" Senator Cummins must mean—in view of the figures he uses—the "operating income" which the railways have earned—in other words, the excess of earnings over operating expenses, taxes, etc. In 1916 the operating income was \$1,043,000,000; but this was not really the "capital charge." The total net dividends and interest paid by the railways in that year amounted to only \$834,600,000. This was but \$69,600,000 more than the \$765,000,000 a year which Senator Cummins estimates a guarantee of 4½ per cent would cost the government.

The difference between the operating income and the net interest and dividends paid was about \$202,000,000. Out of this amount the companies appropriated \$76,500,000 for investment in physical property. The rest was applied to sinking funds, used in extinguishing stock and bond discounts, carried to cash account, etc. Under any system, even government ownership, large investments would have to be made from earnings each year in unproductive improvements, sinking funds would have to be provided for, etc.

Furthermore it is not at all sure that, as Senator Cummins implies, a guarantee of 4½ per cent would be sufficient to enable railway securities to be sold at par. Government bonds which are subject to taxation are now selling on a 5 per cent basis. Besides, elsewhere in his address Senator Cummins indicates that while the government would guarantee 4½ per cent as a minimum this would not be the maxi-

mum which the more successful companies would be allowed to earn and pay. In this part of his address he favors "providing for a corporate ownership of the several systems into which the country could be divided, each corporation with a capitalization representing the actual value of the particular system and the establishment of rates which would produce not only the cost of maintenance and operation and the guaranteed return upon capital, but a reasonable sum in excess of the guarantee, the excess to be divided between the stockholders and the working men." But whatever excess over the government guarantee was allowed to be earned would make the "capital charge" more than 4½ per cent, thereby, of course, reducing the savings Senator Cummins estimates would be made.

There is another extremely important point to be considered. What effect would the guarantee of a minimum return to each company have upon the efficiency of operation? The operating expenses always have been and always will be several times as large as the capital charge under any system of ownership and management. Therefore, any system which will tend to stimulate efficiency of operation will be far more valuable as a means of keeping down the cost of transportation to the public than any system which will tend in equal or even greater degree to keep down the capital charge. Senator Cummins recognizes the need for affording an incentive to efficient management by suggesting that the companies be allowed to earn "a reasonable sum in excess of the guarantee." We fear, however, that if the government gave to each company a guarantee of at least 4½ per cent the tendency of the rate regulating authorities would be to so fix the rates that few, if any, companies would be able by efficient management to earn more than the guarantee, in which case the incentive to efficient management would be impaired if not destroyed.

Senator Cummins' address is a notable and statesmanlike document. The system he outlines would, on the whole, be an improvement from the standpoint of both many investors and the public over the system which prevailed before government operation was adopted. But he underestimates the time that would be consumed and the difficulties that would have to be overcome in carrying out his plan. He overestimates the saving in capital charges that it would make and underestimates the extent to which it would impair the incentive to efficient management. If private operation is to be made a success and adequate expansion of railway facilities is to be secured, a more definite assurance must be given to the railway companies that they will be afforded an opportunity to earn an adequate return; but a better method of affording this assurance than that proposed by Senator Cummins can be devised. Indeed, some better methods have been proposed.

Present Prices and Railway Rates

IT HAS BECOME PLAIN that neither under government nor private operation can the railways, while paying present wages and receiving present rates, earn enough net operating income to pay anything approaching a reasonable return. When, however, it is proposed to make a further advance in freight rates, the objection is likely to be made that the rates have been advanced greatly within recent years, and that the traffic could not stand a further advance.

The rates which commodities can bear, however, are determined mainly by the value of the commodities; and any comparison of the advances in the prices of staple commodities with the advance of the freight rates upon them within recent years, quickly establishes the fact that the increase in freight rates has been nowhere near as large in proportion as the increase in prices. The greatest advances in freight rates have been in eastern territory. First, there were the

advances made in the so-called "Five Per Cent Case" in 1914; second, the 15 per cent increase, part of which was granted in 1917 and part in 1918; and finally, the 25 per cent advance made throughout the country later in 1918. The effect of these various advances of the rates upon various commodities moving in large quantities in eastern territory are shown in the following table. The advances which occurred in the same years in the selling prices of the same commodities also are shown:

ADVANCES IN FREIGHT RATES AND SELLING PRICES OF NINE REPRESENTATIVE COMMODITIES, 1914 COMPARED WITH 1919

	1914	1919	Per cent Increase
Wheat (Chicago to New York—994 miles):			
Freight rate N.	\$3.20	\$4.90	53.1
Selling price N.	36.47	79.33	117.6
*Lumber (W. Va. to New York—190 miles):			
Freight rate N.	3.40	4.70	38.2
Selling price N.	9.09	19.96	119.6
Steel Rails (Pittsburgh to New York—516 miles):			
Freight rate G.	2.60	4.00	53.8
Selling price G.	30.02	57.00	89.9
Fresh Beef (Chicago to New York—994 miles):			
Freight rate N.	9.00	13.80	53.3
Selling price N.	260.00	488.00	87.7
†Man'd Iron (Pittsburgh to New York—516 miles):			
Freight rate N.	3.20	5.40	68.8
Selling price N.	22.60	58.40	158.4
Cotton (Middling) (St. Louis to New York—1,105 miles):			
Freight rate N.	9.10	13.40	47.3
Selling price N.	222.60	535.00	140.3
Pig Iron (Pittsburgh to New York—516 miles):			
Freight rate G.	2.45	4.30	75.5
Selling price G.	14.78	33.60	127.3
Bituminous Coal (Fuel) (W. Va. to New York—489 miles):			
Freight rate N.	1.80	2.40	33.3
Selling price N.	1.02	2.50	145.6
Stone (Ballast) (Mt'sb'g to C-ville—172 miles):			
Freight rate N.	1.00	1.40	40.0
Selling price N.	.43	.89	107.2

Freight rate and selling price on ton basis.

N = Net ton. G = Gross ton.

*Lumber—Average of chestnut, hemlock, white oak and yellow pine.

†Manufactured Iron—Average of iron bars, steel bars, plates and shapes.

‡Prices paid at mine or quarry.

It will be noted that in the cases of all these commodities, the increases in prices have been much greater in proportion than the advances in rates. The advances in rates have varied from 33 to 69 per cent; the advances in prices, from 88 to 158 per cent. The rates now actually charged, therefore, in spite of the advances which have been made, are lower, and in most of these cases much lower, relatively to the value of the commodities than they were five years ago.

A more complete series of comparisons of the advances in rates in eastern territory with the advances in prices of commodities might not yield corresponding results; but that it would show that, on the whole, the increases in prices in that territory have been relatively greater than the advances in rates can not be seriously questioned.

But these comparisons are merely between the advances in rates and increases in prices which have occurred in eastern territory. Now, the increases in commodity prices have been approximately uniform throughout the country. On the other hand, while the advance in freight rates in eastern territory in the last five years probably have averaged 45 per cent, the advances in the southern and western territories have not averaged much over 25 per cent. Therefore, the disparity between the advances in rates and the increases in prices in other parts of the country has been much greater than it has been in eastern territory.

Since the freight rates which the commodities can bear are roughly in proportion to their market value it is clear that most commodities easily could bear much higher rates than are now being charged. As to the cost of the transportation service, it is now exceeding what is being paid for it, as the deficits of the Railroad Administration demonstrate. Therefore, whether measured by the cost of the service or the value of the service, freight rates, although much higher than a few years ago, are too low and should be advanced.

It is said that another advance in rates would cause further increases in commodity prices and, thereby, another increase in the cost of living. Perhaps that is true. But is

it not fairer that those who actually receive the transportation service and benefit by it should pay the entire cost of it, than that the taxpayers, whose taxes have no relationship to the amount of transportation they use, or the benefits they derive from it, should be required to pay part of the cost of it, as they are now being required to do?

Pere Marquette

THE PERE MARQUETTE earned, under federal operation in 1918, the full rental which the government is to pay the company which owns the property. This was accomplished by holding down transportation expenses. The average train load in 1918 was 670 tons as against 582 tons in 1917. The property was operated in 1918 by F. H. Alfred as federal manager. Mr. Alfred had, prior to the reorganization, been one of the two receivers and, when the property was reorganized, had been elected president.

The government's rental amounts to \$3,748,000, and after paying war taxes and interest on bonds there was a surplus of \$1,894,000 or the equivalent of 5 per cent on the prior preference 5 per cent cumulative stock and 10.7 per cent on the \$12,429,000 preferred stock on which dividends are cumulative at 5 per cent after January 1, 1919.

The earnings of the property under federal operation amounted to \$28,955,000 in 1918 and after the payment of expenses and rentals there remained \$3,851,000 or something over the rental due the company. The operating revenues were greater in 1918 than in 1917 by \$5,447,000, due to an increase in the ton mileage of freight handled and to the increased freight rate received. Passenger business fell off but the increase in passenger rates permitted the Pere Marquette to just break even, as compared with the previous year, in its passenger earnings. The number of tons of revenue freight carried in 1918 was 14,242,000, or 7.3 per cent more than in 1917. The average haul was 5.5 per cent longer, being 196 miles in 1918, so that the ton mileage amounted to 2,796,000,000 in 1918, an increase of 13.3 per cent over 1917. The number of passengers carried, however, was 3,571,000 a decrease of 23.3 per cent. The average passenger journey was a little longer, but the decrease in passenger mileage was 20.5 per cent, the total in 1918 being 168,195,000. The passenger fare per passenger mile received by the company was 2.517 cents in 1918 as against 1.991 cents in 1917, an increase of 26.4 per cent.

Notwithstanding the increase of over 13 per cent in freight, the freight locomotive mileage was 1.6 per cent less in 1918 than in 1917. Helper mileage, however, increased from 160,000 in 1917 to 194,000 in 1918, but this was much more than offset by a decrease of 8 per cent in switching locomotive mileage, 6.6 per cent in road train switching miles and 9.3 per cent in passenger locomotive switching miles. The reduction of over 20 per cent in passenger business was accompanied by a reduction of 12 per cent in passenger locomotive mileage.

The increase in train load is all the more notable because the traffic was apparently less well balanced in 1918 than in 1917. Loaded freight car miles totalled 104,562,000 in 1918, a decrease of 3.7 per cent as compared with the previous year, while empty freight car mileage totalled 38,153,000 in 1918, an increase of 12.8 per cent. A large increase in the tonnage of bituminous coal carried may have been a help in getting a larger average train load. Of the total 14,242,000 tons of freight carried in 1918, 30.09 per cent was bituminous coal, comparing with a bituminous coal tonnage in 1917 which was but 25.85 per cent of the total 13,270,000 tons carried in that year. As a commentary on general business conditions in the territory served by the Pere Marquette, it is interesting to note that the tonnage of automobiles carried in 1918 was 139,000, which was 103,000 less than in 1917.

The tonnage of cement, brick and lime was 377,000 in 1918 or 189,000 tons less than in 1917, while the tonnage of sugar beets carried in 1918 was 291,000, an increase over the previous year of 113,000 tons.

Total operating expenses, under federal management, amounted to \$23,316,000, an increase of \$5,934,000, but of this increase only \$2,308,000 was in transportation expenses, the total of these expenses in 1918 being \$12,234,000. The increase in train load, the decrease in passenger mileage, and especially in switching mileage, indicate pretty clearly how transportation expenses were held down so remarkably well.

Maintenance of way cost \$3,790,000, an increase over the previous year of \$1,365,000, and maintenance of equipment cost (exclusive of depreciation) \$5,608,000, an increase of \$2,187,000. There was \$536,000 charged for depreciation of equipment in 1918, an increase of \$62,000 over the charges on this account in the previous year. The cost of repairs of equipment per unit of equipment, exclusive of depreciation, renewals and overhead, was as follows:

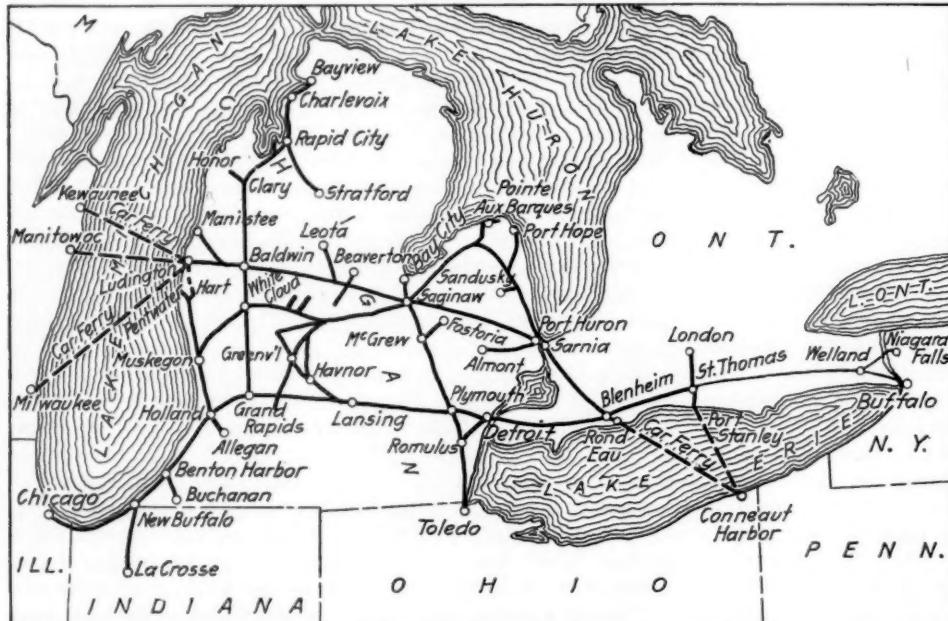
	1918	1917
Locomotives	\$6,194	\$3,354
Passenger train cars.....	997	588
Freight train cars.....	126	81

The following table shows the percentage of each class of operating expenses to total operating revenues:

	1918	1917
Maintenance of way and structures.....	13.09	10.32
Maintenance of equipment.....	21.22	16.57
Traffic	1.19	1.88
Transportation	42.25	42.22
General	2.60	2.74
*Total operating expenses.....	80.52	73.93

*Including miscellaneous.

During 1918, 586 40-ft. automobile cars of 40-ton capacity were bought and put in service; also 10 switching lo-



The Pere Marquette

comotives and 15 Santa Fe type locomotives. The average cost of the automobile cars was \$1,808, and the average cost of the switching locomotives was \$39,130 and of the Santa Fe type locomotives \$56,146. There were 313 freight cars, five passenger cars and four locomotives retired during the year. The Railroad Administration credited the Pere Marquette with the ledger value of the equipment retired, but the Pere Marquette claims—to the layman it certainly seems justly—that since the federal control act requires property to be returned to the corporation in as good condition as when it was taken over, the federal administration ought to make good any shortage of equipment not replaced.

There was \$4,447,000 spent for additions and betterments; the greater part being for new equipment, the cost of which has already been mentioned.

The following table shows the principal figures for operation in 1918 as compared with 1917. This is not the income account of the corporation.

	1918	1917
Average mileage operated.....	2,239	2,248
Freight revenue	\$22,200,348	\$16,850,266
Passenger revenue	4,233,797	4,213,804
Total operating revenues.....	28,955,012	23,507,855
Maintenance of way and structures.....	3,790,387	2,425,689
Maintenance of equipment.....	6,143,894	3,894,690
Traffic expenses	344,773	442,858
Transportation expenses	12,233,619	9,925,781
General expenses	753,118	644,976
Total operating expenses.....	23,315,551	17,381,446
Taxes	697,488	566,945
*Surplus	3,851,484	3,634,952

*This is operating income less rentals, etc.

CORPORATION INCOME ACCOUNT

	1918
Rental	\$3,748,196
Gross income	3,779,738
Taxes	167,243
Interest	1,691,970
Surplus	1,894,125

Buffalo, Rochester & Pittsburgh

THE THREE YEARS in the test period on which the rental of the Buffalo, Rochester & Pittsburgh in 1918 was based, were fairly prosperous ones and the standard return of \$3,276,000, which the government agreed to pay the company for the use of its railroad property, is larger than the operating income from the operation of the property in 1917. The fact, however, that the company received in addition to its net operating income in 1917 \$1,183,000

from equipment and joint facility rentals and paid out only \$319,000 on this account, makes the gross income in the two years not greatly different. After the payment of interest, etc., there was a surplus available for dividends of \$1,119,000 in 1918 and \$1,068,000 in 1917. The company could, therefore, have paid six per cent dividends on both its preferred and common in the entire year 1918, as it did in the latter part of 1916, in 1917 and in the first part of 1918. It will be remembered, however, that the Buffalo, Rochester & Pittsburgh reduced its dividend rate to four per cent on the common in the latter half of 1918. So far, therefore, as the stockholder is concerned in regard to safety of dividends there is nothing to lament about.

It is rather startling, however to think of the Buffalo, Rochester & Pittsburgh as operating on over a 95 per cent ratio of expenses to revenues. This is, of course, a Railroad Administration matter and not a corporation problem, but it is of vital interest to railroad security holders and to railroad men in general, because of the bearing that it has on the conditions which will confront the owning corporations when they again begin to operate their properties. The Buffalo, Rochester & Pittsburgh has been a particularly well and economically operated property, and is in a geographical situation to profit by great industrial activity, such as prevailed in 1917 and 1918, but is also in a position to feel to the full the effects of labor shortage and higher wage schedules in other industries as well as on the rail-

roads, and to suffer from higher material costs. This latter fact possibly needs a word of explanation. A railroad running through the coal fields and into the Pittsburgh district is in times of industrial depression and low prices able to buy much more closely than a railroad in the west, for instance, but for this very reason when prices advance abnormally, as they have in the last two years, the spread or percentage of increase on a road like the Buffalo, Rochester & Pittsburgh is even greater than on roads not so intimately connected with the coal and industrial situation. Since the signing of the armistice coal production has dropped off to minimum but wage rates on all railroads have continued to go up and this has hit the Buffalo, Rochester & Pittsburgh doubly hard because it is a coal road.

When the Railroad Administration took over the actual

to \$14,975,000 in 1917. Nearly the entire increase in revenue was due to higher rates. The ton mileage of freight handled amounted to 2,844,000,000 in 1918, as against 2,697,000,000 in 1917, and passenger mileage to 51,380,000 in 1918, as against 57,112,000 in 1917. There were no important changes in the character of the traffic carried, the increase in ton-mileage being accounted for by an increase of three miles in average length of haul, this figure being 173.6 in 1918, and an increase in the tonnage of bituminous coal, coke and iron ore.

Total operating expenses in 1918 amounted to \$17,577,000, an increase of \$5,699,000, or 48 per cent. Maintenance expenses increased even more than transportation expenses, but the increase in transportation expenses amounted to \$2,367,000, or 41 per cent. For years the Buffalo, Rochester & Pittsburgh has been able to offset the increasing unit costs of operation, with no increase in rates, through greater efficiency in operation, heavier train loading and the farsighted but conservative adoption of heavier locomotives, with the attendant increase in weight of rail, strength of bridges, etc. In 1918 the largest stride in the history of the property was made in increased train loading. The average train load was 943 tons, comparing with 836 tons in 1917, 777 tons in 1916, 707 tons in 1915 and 694 tons in 1914. Never before in a single year had a hundred tons been added to the average train load. This showing is all the more remarkable in that traffic was not as well balanced in 1918 as in 1917. The Buffalo, Rochester & Pittsburgh is not a low grade road. On the contrary its profile shows a succession of fairly heavy grades against both north and southbound traffic, and to have attained an average train load of over 900 tons is a remarkable achievement.

The number of loaded cars per freight train was 23.24 in 1918 and 21.60 in 1917. The average number of empty cars per train was 18.01 in 1918 and 15.70 in 1917. The percentage of empty cars to total number of cars per train was 44 in 1918 and 43 in 1917. Steady progress had been made in years past in heavier loading of cars and this was maintained in 1918, and the remarkably high figure of 40.93 tons was reached for the average per loaded car last year, comparing with 38.69 tons per loaded car in 1917. When we take into consideration these evidences of good railroad operation, the increase in transportation expenses seems high, nor does an examination of the detailed figures for transportation expenses lead to the discovery of any peculiar circumstances, other than the general increase in the cost of labor and materials, which would explain the large increase in transportation expenses.

Maintenance of way expenses in 1918 amounted to \$2,824,000, an increase of \$1,369,000 over the previous year and the increase was due both to larger amounts spent for materials and larger amounts paid to labor. Thus, ties for renewals cost \$266,000 in 1918, as against \$154,000 in 1917, and labor for track laying and surfacing cost \$873,000 in 1918, as against \$455,000 in 1917. Repairs to shops and enginehouses amounted to \$247,000 in 1918, as against \$118,000 in 1917.

Maintenance of equipment in 1918 cost \$5,966,000, an increase of \$1,922,000. The increase in cost of repairs of locomotives alone accounted for more than half of this increase in total. Repairs of locomotives amounted to \$2,545,000 in 1918, or \$1,002,000 more than in 1917. The Administration charged a rate of 4½ per cent for depreciation of locomotives delivered in 1918 but continued the rate of 3 per cent on cars.

The Buffalo, Rochester & Pittsburgh equipment on January 1, 1918, was in as good or better shape than it had ever been in the history of the property. Great care and forethought have been spent on ordering the types of cars and locomotives best adapted to the particular requirements of the road. The company has been very liberal in times past in providing equipment, both because it was rightly con-



The Buffalo, Rochester & Pittsburgh

operation of the properties William T. Noonan, president of the Buffalo, Rochester & Pittsburgh, elected to remain with the corporation and T. F. Brennan, who had for a year been vice-president, and had for a number of years prior to that been general manager, was made federal manager. E. F. Robinson, who had been in charge of operation for a year prior to 1918 and chief engineer prior to that, became chief engineer under the Railroad Administration. With the exception of the executive, therefore, the same men were operating the property under the government as operated the property for the corporation.

Total operating revenues of the property (not the corporation in 1918) amounted to \$18,480,000 in 1918 and

sidered economical to buy the best and because an ample supply of cars was a necessity in successfully meeting competition and providing for the future. So thorough were the repairs given to equipment in the Buffalo, Rochester & Pittsburgh shops that the cost of repairs per car per day on foreign lines due to owner's defects had been reduced to an average of five cents.

Under competitive conditions it had been possible to conserve for use on the Buffalo, Rochester & Pittsburgh itself, B. R. & P. equipment sufficient to handle by far the greater part of the traffic. In 1918, on the other hand, this equipment was scattered far and wide over the country and the traffic on the property itself was necessarily handled by a considerable proportion of foreign equipment. This was reflected in increased expenses not only of maintenance of equipment, but of maintenance of way and of conducting transportation. In mixing lighter and less well maintained cars with the company's own heavier coal and ore cars, not only was the lighter equipment damaged, but the danger of derailment and tearing up of track, etc., was increased. The equipment situation also necessitated considerably more switching work than would have been necessary had the company retained its own cars.

The following table shows the percentage of operating expenses to total operating revenues in 1918 and 1917:

	1918	1917
Maintenance of way.....	15.28	9.71
Maintenance of equipment.....	32.29	27.00
Traffic	1.02	1.28
Transportation	44.26	38.82
General	2.13	2.37
Total, including miscellaneous.....	95.12	79.32

During the year 1918 the property received 39 new freight locomotives and eight new passenger locomotives. These were orders placed by the corporation in 1917 and the cost was charged to the corporation's capital account. It is interesting to note that eight old locomotives were equipped with superheaters and 33 Duplex stokers were purchased. The Buffalo, Rochester & Pittsburgh has been exceptionally liberal in the provision of ample equipment. The purchase of heavier and heavier locomotives was in accordance with a well balanced plan of general improvement and the road now has in service 7 heavy Mallets (113,000 tractive power), 41 light Mallets (80,000 tractive power), 48 Mikados and 229 lighter freight and switching locomotives. The 39 freight locomotives received in 1918 included all seven of the heavy Mallets and 17 of the light Mallets mentioned above. The company placed its orders before the heavy rush of orders had driven prices up to their present level and got its heavy Mallets for \$92,500 apiece and its light Mallets for \$71,850.

The corporation spent \$1,948,000 for additions and betterments to road and structures, the two largest expenditures being on the terminal facilities at Elk Run Junction, Pa., and at East Salamanca, N. Y. Both of these terminal improvements, which involved extensive changes in and additions to facilities, have now been completed.

The table shows the principal figures for operation of the property. This is not the corporation income account.

	1918	1917
Mileage operated	590	585
Coal freight revenue.....	\$10,955,346	\$8,499,013
Coke freight revenue.....	565,584	401,257
Merchandise freight revenue.....	4,917,019	4,219,568
Passenger revenue	1,335,097	1,313,594
Total operating revenues.....	18,479,659	14,975,000
Maintenance of way and structures.....	2,823,761	1,454,770
Maintenance of equipment.....	5,966,244	4,043,988
Traffic expenses	187,924	191,523
Transportation expenses	8,179,786	5,813,030
General expenses	393,795	354,834
Total operating expenses.....	17,577,208	11,878,566
Taxes	294,580*	506,000
Operating income	607,528	2,590,075

	1918	1917
Gross income†	3,353,337	3,906,076
Net income	1,148,311	1,739,820
Appropriations	29,355	671,715
Income available for dividends.....	1,119,956	1,068,105
Dividends	885,000	990,000
Surplus	233,956	78,105

*Excluding war taxes, which are paid by the corporation.
† Rental in 1918.

Letters to the Editor

Clifford Thorne on English Freight Rates

CHICAGO

TO THE EDITOR:

My attention has been called to a letter by W. M. Acworth of London, England, referring to my testimony before the Senate committee on Interstate Commerce, Mr. Acworth's letter being published in your magazine, volume 66, No. 11, page 573.

I did not quote Mr. Acworth in regard to any comparison of rates. I simply used Mr. Acworth's work, referred to specifically in my testimony, in order to secure a typical or representative list of commodities and hauls in England. The rates were brought down to date by a London authority.

In addition to these specific comparisons of rates I made certain comparisons of revenues, using estimated hauls and average revenues per ton, all traffic. An examination of the transcript of the proceedings before the Senate committee will confirm the accuracy of my statement.

CLIFFORD THORNE.

Not an Unqualified Recommendation

CHICAGO

TO THE EDITOR:

Your report of the discussion of my paper on "Creosoting Wood Signal Trunking to Extend its Life," presented before the recent meeting of the Railway Signal Association as appearing in the *Daily Railway Age* of March 18, page 644, due to the partial publication of my reply to Mr. Dryden places me in the position of recommending without qualification, treatment with zinc chloride. This is, first, incorrect, and second, far from the fact. May I, therefore, ask you to now publish a corrected reference to that discussion? The official transcript records my remarks as follows:

"Mr. Barth: I don't see where there would be any objection to using zinc as long as it doesn't interfere with the operation of your apparatus. That is a question I cannot answer. You can use zinc providing, of course, that the zinc treated timber is employed in dry situations. It is not suitable where there is an average rainfall or a lot of moisture which will cause leaching of the salt solution.

"Zinc chloride is soluble in water. If you are in a dry territory where there is less danger, as for instance, in the West where zinc treated ties have given excellent service, I should say that the zinc treatment there would apply also in the case of trunking. However, the advantage of creosote over zinc is that creosote is insoluble.

"As far as procuring creosote goes—you will understand that I have recommended in these surface treatments, of which I am primarily speaking, an oil, meeting the specifications of the United States Railroad Administration (R-828-A), which can be obtained in reasonable quantities at the present time."

KURT C. BARTH,
The Barrett Company.

Alonzo Sargent, the engineman at fault in the collision at Ivanhoe, Ind., on June 22, was tried in court in Indiana last week, and the trial resulted in the disagreement of the jury. Acting on the instructions of the court, the jurymen considered the question whether Sargent was or was not guilty of involuntary manslaughter.

Fuel Conservation on the Northern Pacific*

A Fuel Instruction Car and Moving Pictures Bring Big Results

By M. A. Daly
Fuel Supervisor, Northern Pacific

THE NORTHERN PACIFIC links together Wisconsin, Minnesota, North Dakota, Montana, Idaho, Washington, Oregon and Western Canada; yet, we don't feel that we are very far from the east. I suppose this is because every year we go to West Virginia and Pennsylvania to buy coal with which to supply a large percentage of our locomotives throughout the following year. Nevertheless, it is a long distance to haul coal. The average rail haul is about 200 miles from the eastern mines to the Lake Erie ports, where the coal is loaded into ships. It is a 900-mile boat haul from the Lake Erie ports to Duluth. At Duluth the coal is again loaded into cars and hauled by rail as far west as the Missouri river, a distance of 500 miles. By the time it reaches its destination the coal has become very expensive—and that is just the reason why our people have felt compelled to do everything they could to get the greatest possible amount of heat out of every ton of coal used.

The necessity developed a campaign of fuel economy, beginning about eight years ago, and we have kept right at it ever since. It has been largely an educational movement, designed to interest not only the men who handle coal, but the officers who supervise the operating performances.

Fuel Instruction Car

To introduce the work a passenger coach was fitted up as a traveling lecture room†. Chemical and physical apparatus was installed to demonstrate the properties of coal and the chemistry of combustion. Stereopticon views and motion pictures were added from time to time, as needed.

In passing over the line, at suitable intervals, the instruction car was located at places convenient for the men at the various division points. Locomotive and power-plant engineers and firemen, interested roundhousemen, despatchers, yardmasters, superintendents, trainmasters, master mechanics, road foremen and other local officers presented themselves for the various lectures. The responsibilities of individuals were reviewed, proper methods of handling coal were emphasized and fascinating possibilities were pointed out.

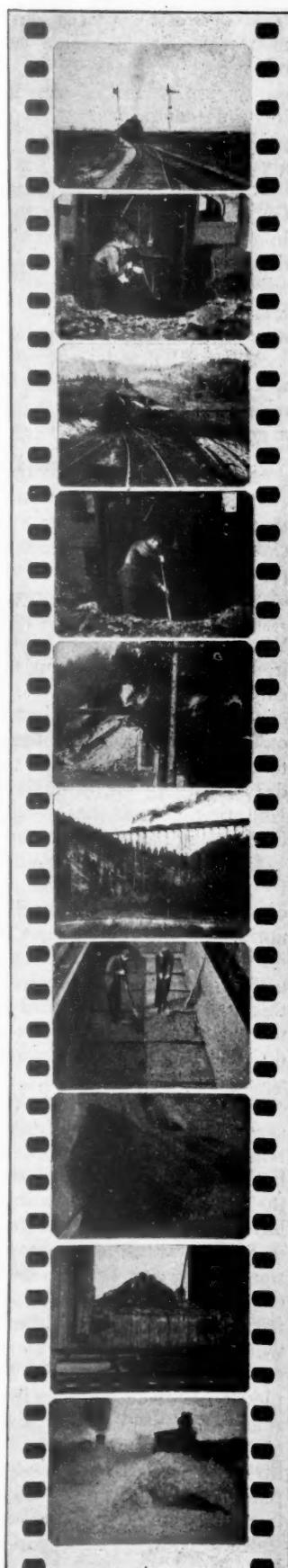
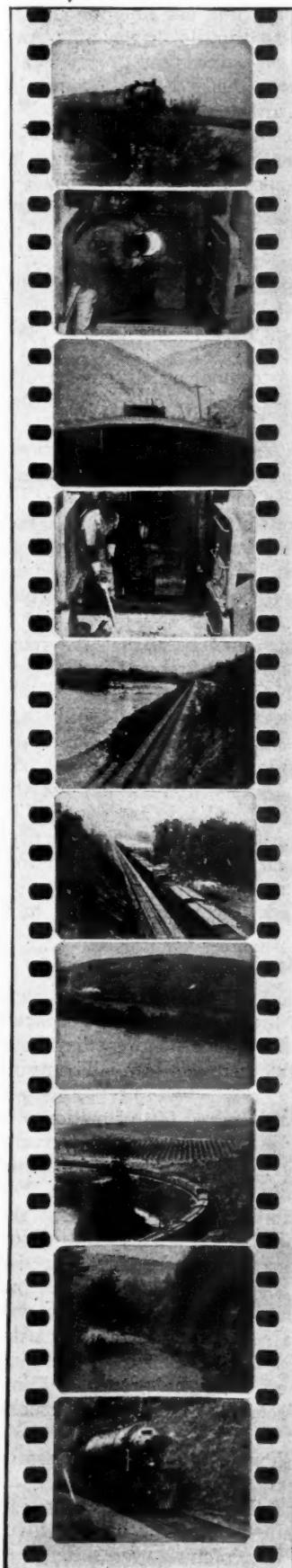
With all who are directly or indirectly concerned with fuel the plan has been to realize a common understanding of its great value, develop an appreciation of the actual losses in known wasteful practices, and to anticipate the enormous savings to be accomplished by concerted efforts, systematically and persistently applied.

It was made clear from the start that fuel saving was a non-departmental matter, that instead of being the work of one department it was a matter of interest for all departments. And it was easily shown that there was enough available glory to be obtained so that all departments could take some of the credit.

Beginning with the preparation of coal at the mines attention is given to all phases of distribution, consumption and accounting. But, since approximately 95 per cent of all railroad fuel is consumed on locomotives, it naturally follows that special attention is given to its use on locomotives. Just as some engines through improper condition may burn more

*Abstract of an address before the New York Railroad Club, April 18, 1919.

†A description of the car and an outline of the lectures which are given was published in the *Railway Age Gazette* of May 1, 1914, page 976.



coal than others (of the same class), so, some enginemen through improper operation may burn more than other enginemen, and some firemen through improper handling may burn more than other firemen.

According to observations on various railroads, one fireman may burn as much as three tons per trip more than other firemen in the same service, using the same engine, on a similar train, over the same piece of track, under identical conditions. Now, men in general take a natural pride in doing good work. Once show a man that he can give better service with less labor and you have confronted him with a double argument which is seldom wholly lost. Once convince a fireman that when coal is properly placed in the firebox it will make more steam and less clinkers, that the required steam pressure will be more uniform and more certain, that the trip will require less shoveling and less shaking, and you have a fireman who is on his way to open-minded appreciation of instructions.

About all that is required for good firing is a little care and attention, with proper intention. Any instructed fireman can supply the necessary care and attention, and become a good fireman.

Talks in Instruction Car

Of the lectures in the instruction car, perhaps the things that most impressed our enginemen and firemen were the chemical experiments illustrating how combustion may take place. In one instance, a wide mouthed bottle was inverted over a lighted candle to prove that when the contained oxygen was consumed burning stopped. Hydrogen was prepared. With a proper supply of oxygen a lighted match could explode it. With no oxygen present, this highly inflammable gas would extinguish a lighted match. Thus, after a series of similar experiments, it was conclusively shown that to have burning, oxygen must touch the fuel. Accordingly it became clear to enginemen and firemen why it was necessary to have a draft bringing air through the grates into the firebox, and why air must constantly supply new oxygen to the pieces of coal throughout the burning firebed.

Considering then that since oxygen of the air is necessary for burning, and, since air cannot well pass through clinkers or banks in a firebed, it follows that clinkers and banks are not desirable things to have in a firebox. Following this line of thought it is but a step to consider that while gas is being driven from each piece of coal that lies in the firebox, this gas cannot be burned unless oxygen comes in contact with it. It then becomes obvious that the best firebox condition is possible only when air is coming through every square foot of grate surface.

In one of the demonstrations a pound of coal is put into a retort, heat is applied and the gases driven off. The coke remaining is weighed and computations made on a blackboard bringing out the fact that approximately one-half of the heat value of coal is in the gas. The gases themselves, having been collected in transparent jars, are then burned in various ways to illustrate proper and improper combustion. They can be burned with a clear, white flame, giving off intense heat, or may be burned with a dull, yellow, smoky flame, developing very little heat. One smoky flame and one white flame are placed under separate test tubes containing equal amounts of water. The white flame evaporated completely the water above it, using much less gas than the smoky flame. We had the smoky flame when the supply of oxygen was not sufficient to burn the flow of gas; that is, the smoky, imperfect, low-heat, extravagant combustion took place when the supply of gas was greater than could be burned by the available oxygen.

Here again was a direct comparison with the locomotive firebed. A fire that is fed at short intervals, with small quantities of coal, properly scattered over the surface of the

firebed, will give a dazzling white fire to be compared with the dull red fire that comes when a large quantity of coal is thrown in at one time. To the enginemen and firemen this latter "slugging" method begins to take on a new aspect; the greater the quantity of coal thrown in at one time the greater the quantity of gas which may be rapidly driven off. And of course, when the quantity of gas exceeds the proportionate flow of oxygen through the grates, the excess gas cannot be burned and will pass off as smoke, through the stack—wasted. Then they correctly conclude that since 50 per cent of the heat value of the coal is in the gas, their aim must be to burn as much of the gas as possible, and thus they are intellectually persuaded to lean toward light and frequent firing, which is clearly the more economical method, and at the same time much the easier.

Firemen were encouraged to experiment for themselves, and it was not long before enginemen and firemen were boasting of the fact that they were making trips on one or more tons of coal less than formerly.

Competition is encouraged by comparing different crews on similar runs, between certain points. Road foremen use tally counters to ascertain the number of scoops, while a pocket scales will tell the weight of an average scoop, allowing the determination of the approximate number of pounds of coal used on the trip.

This all becomes very interesting when facing the fact that our Mikado locomotives often leave terminals with \$125 worth of coal on their tenders, and each locomotive may take on an additional \$50 or \$60 worth of coal at some intermediate coal dock.

Our strong point with firemen has been that the more care exercised in placing the coal in a firebox the less coal will be required on the trip. This fact was taught not only verbally but by actual demonstration. So successfully has the plan worked out that we have men who actually fire our heaviest Mikados with one scoop to a fire. Now, single scoop firing is very particular work. Every fireman has not the patience to work it out, to master it. We do not advocate it, but we do point it out as an ideal to which firemen may aspire. Those who can approach it use less coal than formerly. Those who can master it use the least coal with the least labor. We do not ask our firemen to fire to a diagram.

The Movies

The value of self-criticism has not been overlooked as a means of aiding enginemen and firemen to raise the character of their service. By the use of motion pictures they have been enabled to see themselves as others see them. The result has been very gratifying.

(Mr. Daly then showed several hundred feet of motion picture films which demonstrated in a most forceful way the advantages and disadvantages of proper and improper firing and the losses due to wastefulness and carelessness. For instance, with the moving picture camera mounted on the tender, pictures were shown of firing by the single scoop method as compared to the ordinary methods. Not only did the pictures clearly show the movements of the fireman but at intervals the camera was elevated so that a view was obtained over the top of the cab showing the results at the stack. Pictures were also taken from the roadside showing the trains in motion and the effect of the proper and improper methods of firing as reflected in the amount of smoke from the stack.

Moving pictures were also shown of the wastefulness of overloading tender tanks, of carelessness in unloading and cleaning out coal cars, and of the losses due to popping. In order to maintain interest on the part of the men, particularly during the period of the war, pictures were interposed showing the great need for fuel conservation in order to re-

due to a minimum the number of cars required. Such pictures, for instance, might show the results of the freight congestion at the eastern seaboard, or the great trains of troops and munitions which it was necessary to transport, etc.

Typical individual pictures selected from the films are shown in the photographs, but, of course, they give no adequate idea of the forceful way in which poor or indifferent methods of firing can be contrasted by means of the movies.

Results

Mr. Daly did not include in his paper any figures as to results secured on the Northern Pacific, but during the discussion he was questioned as to this and as to the size of the locomotives on the Northern Pacific. His reply showed that the average tractive power of the freight locomotives in service was high. He was also able to furnish the following figures as to fuel consumption which are taken from reports recently issued by the Fuel Conservation Section of the United States Railroad Administration:

	FREIGHT SERVICE		Pounds of coal per 1,000 gross ton mile	
	December, 1918	January, '19	December, '18	January, '19
N. P.	241	237	162	175
G. N.	279	277	213	221
C. B. & Q.	304	294	223	221
C. & N. W.	275	285	226	242
U. P.	310	291	235	226
C. R. I. & P.	244	255	247	256
M. P.	217	240	176	200
Erie	307	299	206	210
Southern	282	312	281	320
A. T. & S. F.	262	265	209	216
C. M. & St. P.	273	251	212	219

—Editor.)

Discussion by George M. Basford

Let's get our heads out of the sand. Our nation must get out of the wasteful class. It must get over thinking that its resources are limitless. It must conserve many things, first of all coal. Coal comes in train loads. There are other train loads waiting to be moved and all hands on a railroad naturally feel that anything so easy to get is somewhat like dirt and therefore is cheap.

With wages up, probably to stay, and with coal costs doubled, the locomotive must be looked at in a new light. The present generation is to be held accountable for its stewardship. In a large sense it is to be tried on the charge of wasting coal.

Let us acknowledge and appreciate everything that the government and the railroads are doing to improve the firing of coal and the management of the coal itself. Great improvements are being made in this direction. However we must not overlook the fact that the best of coal and the best management of the fire may be nullified by the locomotive itself if the machine is not what it ought to be. This is being overlooked to-day in the case of thousands of old engines.

What is wanted is to put the locomotive in shape for its various parts to pull together to use the coal to best advantage. Boilers should not send wet steam to the cylinders. Fireboxes should not send unmixed and therefore unburned gases to the flues. Tender tanks should not send water to the boiler unheated by waste heat. There are a lot of other ways in which many old engines are working against themselves for lack of modern means for conserving their faculties and abilities. Even the best of firing of itself cannot insure the proper development of the heat of the coal or its use in producing power. The engine must have the means properly to make and use the power that is in the coal.

How about the 25,000 locomotives that as to power remain as they were built and are ten or more years old? Unless these engines are brought up to date they are antiquated, obsolete and an encumbrance as to power and as to the waste

of fuel. Many of these engines were ten or more years old when they were built. This was because of bridge or other weight limitations. To-day they are in the class of the old Rodman cast iron cannon whereas we have Hindenburg Lines to deal with to-day.

Think for a moment of the taking of the Hindenburg Line. No small factor in the achievement was the confidence the men had in their equipment. They knew that this country had not sent them out without the best of everything to fight with. The inspiration of this confidence was necessary to success. Now think of the men who are handling these old engines we are talking about. What coal saving effort can you expect of men who know that the machine you give them wastes coal faster than they can save it?

In six years the coal consumption of locomotives has gone down from 3.6 lb. per draw bar horse power to 2.25 lb., the figures being taken at the most efficient power of the engine. No parallel improvement has ever been made in six years in any other branch of engineering development.

This has been done by intelligent use of improved designs and by the employment of labor and fuel saving and capacity increasing factors which everybody knows about. These figures show what may be done and what is in everybody's mind to aim at with new engines, but why overlook the 25,000 old ones?

The fortunate feature of these improvements lies in the fact that they may be applied to all old engines that are in shape to run at all and they give these old engines increased power making them, weight for weight, equal to the biggest, newest engines of the latest and best designs and in many instances they will be better adapted for the work they are doing than new engines would be.

I mean that one big thing to do right now is to modernize those old engines—25,000 of them, applying to them the factors that make the modern locomotive take its place among the efficient power plants of the world. The way to do it is to make a survey of the old equipment in complete detail, to decide upon a modernizing program and determine the number of engines to be rejuvenated per month and then follow the program in spite of "hell and high water."

One of the roads that did this found that the improvements paid for themselves in seven months. Every \$100 of cost earned \$171.60 in the first year. This was 171 per cent investment. If the engines had but one year of life ahead of them it would have paid most handsomely. Did it pay? Is this one of the big economies? Does it not put in the shade all other locomotive economies that you can think of?

The steam locomotive of America is too big a factor in the success, stability and happiness of the nation to allow so large a proportion of antiquated equipment to be running hauling tons and hauling people at the high cost that these conditions entail. These old engines ought to be modernized or they ought to be scrapped, and that quickly.

The survey of the power on any railroad will reveal the merits of this question. It is my opinion that this survey is one of the most important immediate problems before the railroads. The best thing about it is that it can be done now and that it will point out the best business policy of the roads—no matter who owns them.

A small engine need not be an uneconomical engine just because it is small. You need lots of small engines and always will need them. They should be put into the efficient class and their lives prolonged. By the way, this policy will overcome the extravagance of the past in the purchase of new power, much of which was necessary merely because there was so much unmodernized power on the road.

Some of you are thinking—"That's all right but where is the money?" Let me tell you where the money is. It is blowing up the stack of every unmodernized engine. The en-

tire first cost of modernizing is wasted in coal every seven to ten months on every one of these engines that is working. That's where the money is.

Did we back away from Germany because we didn't have the money for the war? We got the money!

You will find it easier to convince the hard headed businessmen, the shippers, that you ought to have freight rate increases—after you have modernized these old engines. The shippers understand modernizing. That's why they succeed in business. That's why they have something to ship.

If you have had the inspiration of watching rival gun crews handling modern guns you will appreciate the fact that, to do the work of to-day, which is greater work than that of yesterday, the guns must be *right*. It is not sufficient that the handling only should be right. The results are up to the right guns handled *right*. The more worthy the gun the better it will be served and the more it will do. This is exactly true of the locomotive. Every scoop of coal well fired does the more work when the engine is modernized. Modernizing augments every other means of saving. Let's get our heads out of the sand.

Other Discussion

H. C. Woodbridge, fuel supervisor, Allegheny region, spoke particularly of the part transportation officers have in the conservation of fuel, mentioning a number of things not generally done now which they could do to reduce fuel consumption. When business is heavy it is now a common practice to start trains out from terminals whenever enough cars are available to make up a train, without regard to conditions at either the despatching or receiving terminals. He advocated the despatching of trains according to a predetermined plan, based on a careful study of the expected amount of business for any particular season, in which consideration has been given to conditions at terminals and important intermediate points on the division. In this way temporary congestion at terminal yards and engine terminals may be avoided and the power received only as fast as it can be handled. Such a plan has a marked influence on coal consumption through the elimination of delays.

The maximum allowable tonnage should be maintained, and tonnage should be reduced promptly to meet extraordinary conditions of weather, partial engine failures, etc. Tonnage trains should be given assistance out of the initial terminal to prevent delays in movement during the time in which the train is getting warmed up. Through loads should be segregated and pick-up work confined to certain trains rather than being handled hap-hazard by every train over the division. Trick despatchers and tower men should be made to see clearly the effect on fuel consumption of slowing or stopping tonnage trains. Recommendations from trainmen as to the revision of schedules should be carefully considered; engines should be assigned and not pooled; the road foremen's time should not be taken up in conducting efficiency tests, etc., but devoted to supervising the operation of the locomotives on the road; the use of unnecessary lighting should be discouraged, and men should be disciplined for pulling apart air hose and allowing locomotives to waste steam at the pops. A close check should be kept on slow orders to eliminate their use or continuance except within absolutely necessary limits. The most efficient engines should be used and the inefficient ones scrapped or stored.

Robert Collett, fuel supervisor of the Eastern region, laid stress upon the fact that nothing saves so much coal as an all-around good job of railroad operation. Any practice or plan which tends to improve general operating conditions is bound to reduce the consumption of fuel. Mr. Collett said that his conception of the function of the Fuel Conservation Section lay more in passing on the good things already being done from one road to another, than in initiating absolutely

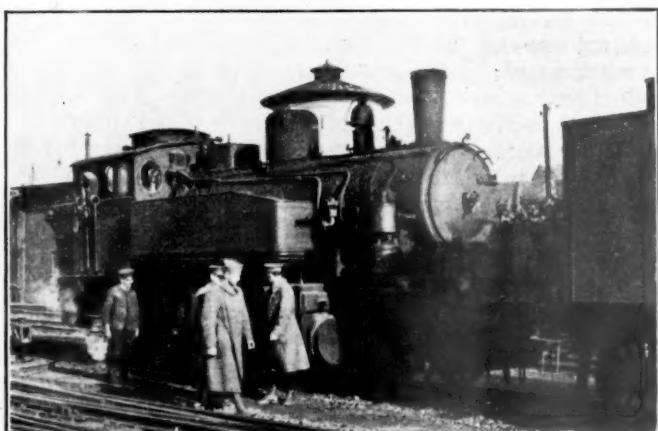
new practices. In dealing with the use of coal on the locomotive he suggested that more stress be placed on telling the men about their good performances than in continually criticising them for their failures. The business of a railroad is to move trains and enginemen should not be criticised if they place more stress on keeping engines hot than upon the question of fuel economy, unless they have been thoroughly instructed in the best methods of firing and operating locomotives. As an evidence of the effect of operating conditions on fuel economy, he mentioned the fact that a 40 per cent difference in fuel used on the same passenger train on two succeeding days had been observed, where the difference in conditions lay in the necessity for stopping at block signals in one case, whereas a good run was made in the other.

Mr. Collett quoted from a comparative statement recently issued by the Fuel Conservation Section, which shows that the best results in reduction of fuel consumption on a gross ton-mile and passenger car mile basis have been obtained in the Central District of the Eastern region. Comparing the last six months of 1918 with the last six months of 1917, thus eliminating the effect of the extraordinary weather conditions prevailing during the early months of 1918, the average reduction in freight unit consumption for this district was 9.2 per cent and in passenger train-unit consumption 7.1 per cent. As shown by the available statistics, the total reduction in all regions was 5.5 per cent in freight service and 3.2 per cent in passenger service.

H. B. Brown, superintendent fuel department, Lehigh Valley, referred to the fact that, next to labor, fuel is the largest single item in railroad operating expenses and that the coal bill of the railroads was \$150,000,000 greater in 1918 than in 1917, a fact which necessitates the redoubling of efforts to conserve coal from the standpoint of economy. He also referred to the necessity of fuel economy from the standpoint of the conservation of a natural resource which is not inexhaustible.

George L. Fowler called attention to the effect of proper firing methods on boiler repairs, stating that the opening and closing of the fire door produces a change in temperature of the firebox sheets reaching a maximum of 100 deg. F. in some parts of the firebox.

W. E. Symons referred to economies which could be effected in the 15 per cent of railroad fuel not burned in locomotives. By converting coal into producer gas for stationary power plant purposes, as high as \$1.80 per ton may be realized from the sulphate ammonia, which is a by-product of the gas producer process.



Photograph by International Film Service Company, Inc., N. Y.

American Officers, Accompanied by German Railway Experts, Examining Locomotives to Be Turned Over to the Americans

A Statesman's View of the Railroad Problem*

Consolidations, Private Operation and Government Guarantees of Return Proposed

By Albert B. Cummins
United States Senator from Iowa

BARRING, POSSIBLY, the proposed League of Nations, the readjustment of the relation between the government and the railroads is by far the most important and most difficult of the many problems of reconstruction which the war has bequeathed to the United States. There can be no prosperity, no proper development, no enduring growth, unless our system of transportation, both internal and external, is adequate in its facilities and reasonable in the charge for the service rendered. The people of the country should turn their minds to the question in a serious, determined way. They must think of it fundamentally, and with intelligence adopt a policy which will not only be economically sound, but which will furnish sufficient transportation to meet the constantly increasing demands of business, and furnish it at the lowest possible cost consistent with fairness to the capital invested, and to the men whose brain and brawn conduct and operate railway properties. We ought to bear constantly in mind these two requisites as the basis of all our efforts toward regulation and control. I repeat them: First, adequacy of facilities; second, cost of maintenance and operation.

Dismissing for the moment the former, my greatest desire is to impress upon you and the country the fact, never to be forgotten for a single moment as we pass through this discussion, that the cost of transportation is composed of just two items: First, the charge for capital; and, second, the charge for maintenance and operation.

If we are to serve successfully the general welfare our labors must be directed toward reducing, if we can, the charge for capital, and toward securing the utmost efficiency and economy in maintaining and operating the railway properties compatible with fair compensation to those whose minds and hands are engaged in rendering the service we require.

Looks Upon Transportation as Government Function

In order that there may be no misunderstanding as to my attitude, I desire to say in the beginning that I look upon transportation by railway as a governmental function. I believe it is just as much the duty of the government to provide the people with adequate transportation at the lowest cost as it is to provide them with adequate highways, adequate water supply, adequate courts of justice, or adequate police protection. Whether the government can best perform this function through the government ownership and operation of railroads, or through the instrumentalities of private corporations under public control is entirely a matter of sound judgment and wise discretion. Whatever course is pursued the test must be the same. It is our manifest duty to adopt the plan which will give to the people of the country the transportation which they require at the lowest cost.

It is clearly recognized by every country in the world that government ownership and operation of railroads is a proper governmental activity, and if a particular government selects some other agency through which to accomplish its purposes it is solely because the commerce of the country can be better served through such agency. I interpolate this thought simply because there are some men who seem to believe that

in government ownership and operation there is a dangerous approach toward socialism as it is generally understood. Nothing could be more erroneous than this view of the subject. I do not intend to enlarge upon this phase of the matter, and mention it only to quiet the fears which seem to disturb the composure of a great many good citizens.

I emphasize again the proposition already announced: The object which Congress must constantly bear in mind is the necessity for transportation, and the right of the people to have it upon reasonable terms. If they can secure better transportation and at lower rates through government ownership and operation that is the system which should be adopted. If, on the other hand, the object can be attained in a higher degree by employing private instrumentalities under public direction and control, it is obvious that we ought to pursue the latter course.

Magnitude of the Subject

With these preliminary observations I beg to turn your thought, first, to the magnitude of the subject with which we must deal; and, second, to some historical facts which may be of value in determining what we ought to do.

The railways of the United States constitute about one-twelfth of all the property of the country. We have 260,000 miles of railway lines—more than one-third, nearly one-half of all the railways of the world. These railways of ours carry a yearly traffic so much greater than that of any other country that there is really no basis for comparison. Indeed, the traffic of any two nations may be combined and still it does not approach the commerce of America borne upon American railways.

The average capitalization of our railways is \$67,000 per mile, and while that may be greater than the cost of the properties, and I am quite convinced that it is, yet it is still true that it is considerably less than one-half the average capitalization of railways throughout the remainder of the world.

When we approach the radical readjustment of the system of control and regulation of such a property, appreciating its intimate relation with every other business activity, it is not difficult to understand the deep sense of responsibility which those who are engaged with the readjustment must feel; and the consciousness that the work must be done after the most complete inquiry, the most careful reflection, and the most intelligent comprehension of the subject in all its vast ramifications.

It is easy to demonstrate that these railways were not all built where they should have been built, and that the construction of hundreds of them was attended, not only with profound ignorance of the most fundamental principles of railroad building, but with a greed and graft which shocks the modern investigator; but which, happily, cannot be repeated in the future. Nevertheless, the railroads were built, communities have been developed which rely upon them, and it is idle to think even of dismantling any considerable number of them or of changing the channels of commerce which have now been established.

It is not my purpose to inquire into the iniquities of either the original construction of the railroads or into the dishonesty

*An address delivered on March 27 before the General Assembly of Iowa. Senator Cummins is the ranking Republican member of the Senate Committee on Interstate Commerce, and undoubtedly will be re-elected its chairman when Congress meets again.

which accompanied the capitalization of the railway corporations. Much of the wrong-doing can never be punished, and much of the injustice can never be repaired. Nearly a generation has passed since most of these things were done, and the railways are in the hands of a new and better body of men, who, in my opinion, have in the main for a decade or more been faithfully endeavoring to comply with the law in the management and operation of their railroads; and it is unfair to inflict upon them all the penalties which their predecessors justly incurred.

In my service as a member of the Interstate Commerce Committee of the Senate I have been in close contact with most of the railway presidents and managers of the country, and I take this opportunity to say that, while I cannot accept in all respects their opinions with regard to the readjustment which everybody admits is imperative, I believe them to be thoroughly honest in their discussion of the subject; and that they have a sincere desire to help, rather than to hinder, Congress in finding the best solution of the intricate and important problem. It is natural that they should be biased, but it is a pleasure to know that all of them recognize that they are engaged in a public service and that the public interest is, and must always be, the paramount consideration.

Passing over the earlier history of the railroads without further remark, I bring your attention to the three years immediately preceding the war. The years 1915-1916 and 1917 were the most profitable years ever experienced in the operation of railways. During these years the funded debt, and I use round numbers, amounted to eleven billions of dollars, and the capital stock, eliminating all duplication, to six billion five hundred millions of dollars. The property investment account, which was intended to show the actual cost of the railway property, but which in fact is inaccurate, as frequently declared by the Interstate Commerce Commission, aggregated something more than eighteen billions of dollars. This does not include all the assets of the corporations. The average net railway operating income for the three years was nine hundred and thirty millions of dollars.

Unequal Earning Capacity of Railways

The average return upon the so-called property investment for the Eastern District was 5.21 per cent. For the Southern District 5.36 per cent, and for the Western District 5.15 per cent. After paying all fixed charges, including interest upon the funded debt, and taxes, the railways earned upon their capital stock all the way from nothing to more than one hundred per cent.

Limiting my inquiry now to what are known as Class 1 roads, being the railways which have a gross income of more than a million dollars annually, and still using the average of the pre-war period and the property investment account for comparisons, a startling situation is disclosed.

In the Eastern District there are 67 railways: Three of them show a net operating income of more than 10 per cent upon the investment account. Two of them show more than 9 and less than 10. Three of them show more than 8 and less than 9. Four of them show more than 7 and less than 8. Five of them show more than 6 and less than 7. Twelve of them show more than 5 and less than 6. Fourteen of them show more than 4 and less than 5. Nine of them show more than 3 and less than 4. Seven of them show more than 2 and less than 3. Five of them show more than 1 and less than 2. Two of them show less than 1, and one of them was operated at a loss.

In the Southern District there are 32 railroads: I need not particularize so closely with respect to them, and it is sufficient to say that upon the property account four of them earned more than 7 per cent; fourteen of them earned less than 5 per cent, and seven of them earned less than 3 per cent.

In the Western District there are 63 railroads: Thirteen of them had a net operating income of more than 6 per cent. Twenty-five of them had a net operating income of less than 3 per cent; and twenty of them a net operating income of less than 2 per cent.

I am stating these facts for one purpose, and one purpose only. It is to fasten upon your minds the disparity in the earning capacity of the various railroads of the country. In my judgment, the railroads earned in the years to which I have referred, as a whole, more than they ought to have earned; but the varying conditions of the several properties present an insoluble problem under our former system of regulation and control.

It is, of course, well known that a very large proportion of the railroad revenues are earned under competitive rates, and no matter what the necessities of a particular railroad may be it must do business upon the rates that prevail among its competitors. I give you a concrete illustration in order to make this point perfectly clear.

You are all familiar with the Chicago & North Western and the Chicago Great Western railroads. They are wholly competitive. The average net operating income of the Chicago North Western for the period named was 6.13 per cent upon its property investment account, while the average net operating income of the Chicago Great Western for the same period was 1.77 per cent. The Chicago Great Western cannot survive upon rates which will enable the Chicago & North-Western to pay its interest and 8 or 10 per cent upon its capital stock, and add every year to its surplus.

What is true of the Chicago Great Western is true in greater or less degree of the railroads which carry about 25 per cent of the traffic of the country. To increase rates so that the weak roads will become self-sustaining and able to finance themselves would give to the roads which do 75 per cent of the business a revenue which the commonest sense of justice forbids.

It was this situation which finally convinced every thoughtful man, even before the war turned the railroads over to the government, that there must be a radical change in the system gradually developed from 1887 to 1917. I beg that you will remember these conditions, for upon them is founded one principle which any readjustment must observe.

Two additional facts and I shall have finished the historical review. The funded debt of all the railroads was, at the beginning of the war, eleven billions of dollars, bearing an interest charge of four hundred and seventy-five millions of dollars, leaving substantially five hundred and fifty millions for either dividends, investment in property or surplus. In 1917 the revenue from operation was substantially four billions of dollars and the cost of maintenance and operation was substantially three billions.

Results of Government Operation

In order to complete the basis for the comparisons I shall institute I pass to a very brief statement with respect to the year of government operation. The President took possession of the railroads on the 29th day of December, 1917. In March, 1918, Congress passed an act which authorized the government to pay for the use of the property a sum somewhat in excess of nine hundred millions of dollars annually. The volume of traffic in 1918 was slightly less than in 1917, but in the first half of the year the rates, both passenger and freight, were increased so that the revenues amounted to a trifle more than four billions nine hundred millions of dollars. That is the aggregate sum which the people of the country paid in the year in freight and passenger charges for their railroad transportation—something like eight hundred millions of dollars in excess of the amount paid in 1917.

The cost of maintenance and operation, however, grew to substantially four billion two hundred millions of dollars, to

which we must add nine hundred millions for compensation and a further large sum yet to be announced for the expense of the Central Railroad Administration.

The outcome is that it cost the government more than five billions one hundred millions of dollars to furnish transportation for the year, leaving a deficit of more than two hundred millions of dollars to be paid from the treasury of the United States.

While the former Director General expressed before our committee the belief, and in this opinion he was joined by the present Director General, that the year 1919 would exhibit more satisfactory results, it is my judgment that the deficit of 1919 will not be less, and may be more, than the deficit of 1918. I do not intend to enter upon an analysis of this deplorable showing of government operation further than to say that the increase in revenues is substantially as great as the increase in wages and the advanced cost of supplies, and the shortage must be largely accounted for by the inefficiency incident to government operation and the tremendous increase in the number of railroad employees—an increase which has always been observed in all countries as they have passed from private to public operation.

Moreover, the government during the year either paid or became responsible for extensions, additions and betterments chargeable to capital account, and which the railroads must repay if they are able, about eight hundred millions of dollars. It is this condition which makes it impossible for the government to return the railroads to their owners until there is far-reaching legislation which will protect both the public and the railroads from the disasters which would inevitably follow an immediate return. Without the necessary credit to finance themselves, and in view of the enormous demands which the war has made, and is making upon the resources of the people, it is clear to thinking men that a return of the railroads to the corporations which formerly operated them without suitable legislation would lead fifty per cent of the railway mileage of the United States into the hands of receivers within six months.

It is the first and highest duty of Congress to deal with this situation in a fundamental way, and to establish a permanent policy for the future maintenance, regulation and control of our transportation systems. No half-way or timid measures will suffice. We must meet the question squarely and boldly. It is no time for shrinking, compromising spirits. I am sure that I speak for every member of the Senate when I invite the best thought of the General Assembly of Iowa to aid in the solution of this exceedingly serious and overwhelmingly important problem immediately confronting us.

You will understand, of course, that the facts which I have recited merely outline the information with which the history of railroads, their development and operation, is crowded, and I assume that you will supplement what I have said with your own comprehensive knowledge of the subject. These facts are sufficient, however, in my judgment, to point the way to the reorganization of our transportation system, and to sustain the principles which must be embodied in any successful readjustment of the relation between the government and the railways.

Some Fundamental Principles

Some time prior to the first of January of the present year, and in anticipation of the hearings which have been in progress before the Interstate Commerce Committee of the Senate for two months or more, I announced to the public a series of principles which, as it seemed to me, should be accepted in the enactment of any fundamental legislation. They are:

First. The return upon the capital invested in railways should be made certain through a government undertaking.

Second. The railways should be consolidated into com-

paratively few systems, and by few I mean not more than eighteen.

Third. The railways should be operated by private corporations organized under an Act of Congress.

Many complete plans of reorganization have been laid before the Senate Committee, brought forward by the most intelligent, thoughtful men of the country, some of whom are railway executives, some of whom represent security holders, some of whom are bankers, some of whom represent commercial and civic institutions, and some of whom are observers and students of economic life in all its varied phases.

It was intensely gratifying to me to discover as the hearing proceeded that all these plans, save one, adopted the substance of the principles which I had made public, although there are wide differences in the form of their application to the actual affairs of transportation.

Will you indulge me while I submit, with such brevity as I can command, the reasons which justify the principles to which I have called your attention?

The return upon the capital invested should be made certain by a government undertaking because:

First, it is highly desirable to remove for all time the demoralizing, corrupting struggle between the owners and representatives of railway property and the public, especially that part of the public directly interested in freight and passenger charges. For more than forty years this conflict has been going on in conventions, elections, legislatures, congresses and the courts. Sometimes the railways have won, sometimes the people have won, but the fight has been so intense that oftener than otherwise the justice of the matter has been ignored by both sides, and it is high time to bring the contest to an end.

Second, the honest investment in railway properties is entitled to protection, and the public is entitled to fair treatment. It is impossible to conceive of any revision of the law that will accomplish these two things without the elimination of the controversy relating to the return upon capital. The certainty of the return is also demanded because furnishing transportation is a public business, and abstractly considered there should be no speculative profit in the business.

Finally, and chiefly, the return should be made certain in order to reduce the charge for the capital invested in the railway properties. So long as the return is uncertain with respect to many railroads, every railroad will insist upon earning all it can.

Taken as a whole, the roads received in 1917 a net operating income of about a billion dollars, and they were contending earnestly for more. In 1918 Congress authorized the President to pay them as compensation during the government possession somewhat more than nine hundred millions of dollars per year, and this did not include many of the short line railways. If the government makes a certain return it can justly reduce the return to a rate of interest which a government obligation ought to bear.

Assuming, but not conceding, that the railways are worth in the aggregate seventeen billions of dollars, a return of four and a half per cent under a government guaranty would be ample. Under such a provision the annual charge for the properties as they now are would be seven hundred and sixty-five millions of dollars. The people paid in 1917 a capital charge of a billion dollars, and we are now paying under government operation a capital charge of more than nine hundred millions of dollars. The principle I have proposed, if embodied in the law, will save the people of the country from two hundred and fifty millions to five hundred millions of dollars annually, for it must be remembered that under the old system the capital charge was gradually increasing, and it is easy to believe that without reckoning any addition to the value of the property the capital charge would soon reach a billion two hundred millions of dollars.

Another vexatious element would be laid at rest. The unearned increment in public utility property is a constant menace. It ought to be understood, once for all, that a fair return upon the actual investment is all that capital can demand. I understand perfectly that many people will instinctively shrink from a guaranteed return, but their reluctance to adopt the principle will disappear upon reflection. There is no possibility of an additional burden; on the contrary, we shall save an immense sum of money every year and at the same time convert railway securities into a stable investment and contribute tremendously to the available credits of the country.

There are various methods in which the principle can be applied. It may take the form of a legislative assurance that the rates shall be sufficient to produce the sum required, but preferably it will be put in a positive guaranty. It may be worked out through the securities as they now exist, but the simpler plan would be for a government corporation to acquire all the properties or all the securities and issue or substitute new obligations.

It is to be understood that in any event there must be a valuation of railway properties, unless there can be an agreement between a government agency, such as the Interstate Commerce Commission, and the owners with respect to value. In my judgment, this principle extends the only hope of a reduction in rates, or of preventing still further increases.

Consolidation, Without Eliminating Competition

The second principle to which I have referred is that there must be a consolidation of the railroads into comparatively few systems. It is utterly impossible to maintain an efficient system of transportation with reasonable rates for service unless this be accomplished. In my statement of the earning capacity of the various roads it was made entirely clear that if the weaker roads are made self-sustaining so that they can continue to serve the communities through which they pass, the stronger roads will enjoy a revenue so excessively large that the people as a whole will be compelled to pay inordinately for their transportation. This is one proposition upon which all impartial students of the subject agree, no matter whether they come from railway life or from the general community. The weaker roads must be merged with the stronger ones into competitive systems which can endure upon substantially even terms. They must be merged, too, under a law that will require at proper times a common use of terminal facilities and a free interchange of equipment, and thus preserve the great advantages of unification, which is the one superiority in government operation.

I am not in favor of regional systems, for we must at all hazards perpetuate competition in service. The experts who have studiously examined the matter are of the opinion that all the railroads of the country could be consolidated into—say 18 systems, and that the competition in service in nearly every locality would be even more keen than when the government assumed control.

I cannot, within the time which I may properly consume, describe these systems, but I know that it is wholly practicable to do what I have suggested. When this is accomplished if any particular system earns enough as a whole to pay the capital charge and the cost of maintenance and operation the law will be satisfied, and all that will remain for the Interstate Commerce Commission to do will be to see that the rates as between communities and commodities are not discriminatory.

I would not have you think that it will be easy to bring about this situation. It will require very considerable time and a high order of intelligence, but it is largely administrative work, and in the hands of men who have devoted their lives to the subject it can be realized without danger to either the

financial, commercial or industrial structure of the nation.

Here again more than one method can be used to embody the principle. It is possible to take railway corporations already in existence and work out the plan with them. My own conviction, however, is that the safer and better method is to put each of these consolidated systems in the hands of a Federal corporation. It is gradually becoming clear that in so far as rates are concerned the national government must be the arbiter. I have come to this conclusion slowly and reluctantly, but it is folly to resist the inevitable conclusion. State made rates which either discriminate against interstate rates, or which do not raise their full share of the required revenue, impair the control over interstate commerce which the Constitution has conferred upon Congress and destroy the efficiency of Federal action. I sincerely hope that there will be found some feasible plan for co-operation in this matter between Federal and state authorities, but in the last resort the Federal agency is supreme.

It seems to me, therefore, that all railway common carriers should be organized under an Act of Congress, although I freely admit that the national government can exercise its full power through state corporations, but with some embarrassment and loss of efficiency.

Government Operation Is Undesirable

The third principle which I have mentioned is that the railways should be operated by private corporations rather than by the government. I want you to observe that I emphasize the distinction between government ownership and government operation. I realize fully that when the government undertakes that the return upon the capital invested shall be certain, or in other words guarantees the return, whether by legislative assurance or explicit obligation, it is the equivalent of government ownership, and in so far as I am concerned, I am quite ready for the undertaking. The truth is that we have government ownership now in its most undesirable form. The Interstate Commerce Commission, under the present law, determines the revenues which the railways shall receive. It thereby determines the expenses which they may incur, and when the technical owner of property loses the right to say how much he shall have for its use, and the right to say how he shall conduct the business of which it is a part, and the right to fix the cost of its operation, he has parted with the essential characteristics of private property.

I favor the private operation of railways under the strictest control for one reason, and one only. The government cannot operate the railroads either economically or efficiently. It is not my purpose to examine the experience of other countries. It is sufficient to say that to my mind that experience is not reassuring. But no matter how that may be I know that the government cannot take seventeen billions of railway property rendering a service which reaches every nook and corner of the land, employing in the service two millions of men or more, and indirectly affecting the fortunes of many other millions, and manage it with either economy or efficiency.

It costs the government more to do any given thing in a country like ours, where every man is a sovereign, than it costs anybody else to do the same thing. The history of every enterprise of a business character conducted by the government proves all and a great deal more than the statement I have just made. I disparage no one, and impugn no man's integrity. What I have said is not only the truth, but it is as natural as life itself.

I admit that the result of government operation during the year 1918—a year of war—is not altogether a fair criterion by which to test the capacity of the government to manage the business of transportation, and it is not my

desire to discredit the officials who have been responsible for what has happened. They have, however, demonstrated that the influences which surround the operation of a great commercial and industrial enterprise are too strong to be resisted.

It is unnecessary for me to enter into the details of this subject and I am content simply to record my opinion in favor of private operation, an opinion based solely upon the ground that the people of the country will get better transportation and at less cost in that way than through government operation; and that, as I view it, is the chief concern of those to whom the service is to be rendered.

Must Afford Incentive to Efficiency

If then, private operation is the better plan, how is it to be accomplished, in view of the limited capital charge which I have already considered? I am fully aware that if private corporations are to operate the several systems which I have described there must be an incentive in the way of profit in order to secure the highest degree of fidelity and efficiency. There must be a reward for good management and honest work, and a penalty for bad management and dishonest work.

Happily, there are several methods through which this problem can be worked out. It can be done through a leasing system, with the rights of lessees carefully prescribed in suitable contracts, but a still better way may be found by providing for a corporate ownership of the several systems into which the country should be divided, each corporation with a capitalization representing the actual value of the particular system, and the establishment of rates which will produce not only the cost of maintenance and operation and the guaranteed return upon capital, but a reasonable sum in excess of the guaranty; the excess to be divided between the stockholders and the workingmen. I am a profound believer in profit-sharing, and when the rule is properly applied it will solve many of the problems which now disturb the industrial world. The additional compensation to capital for efficient management, together with the sum distributed among employees as a reward for faithful labor, will be far less than the increased cost of government operation.

These suggestions could be extended almost indefinitely, but I forbear, knowing that I have sketched but the outline of a mighty field. If, however, I have turned your thought to the real questions which must be answered, and have induced you to give them the study of which you are capable, and thus forward the immediate task in which we are commonly engaged, I have fulfilled my mission, and will be content with your judgment upon my public service in this regard.

One word more and I will have finished what to me has seemed a duty and which I hope you will not look upon as an intrusion upon your valuable time. I intend to discuss this subject throughout the country within the next two months and I felt that I should first lay my views before the law-making body of my own state.

The Supreme Court of the United States on April 21 agreed to expedite consideration of test cases which are expected to determine the question of the authority of the federal government to prescribe intrastate rates for freight, passengers and telegrams. The court fixed May 5 as the date for hearing arguments in three cases involving this question, one of which is the appeal by the Railroad Administration from a decree of the North Dakota supreme court enjoining the Northern Pacific and other railroads in the state from increasing freight and passenger rates within the state as ordered by the director general last year. The other two concern telephone and telegraph rates. It is hoped that final decisions may be reached before the court adjourns for the summer.

Return of Colonel McCrea

COLONEL JAMES A. MC CREA, formerly general manager of the Long Island Railroad, has returned from France and this week made a short address at a Victory Loan rally of Long Island employees at the Pennsylvania Station in New York. A part of the address is given below.

Colonel McCrea went over in the latter part of 1917, and served as general manager of the American railroads and deputy director general of transportation under Brig. Gen. W. W. Atterbury. He has received a distinguished service medal. General Pershing had recommended Colonel McCrea for promotion to brigadier general, but before the recommendation could be carried out the armistice was signed.

With Colonel McCrea at the meeting was Captain Charles E. McLaren, who was in charge of the Long Island Railroad's lighterage department prior to his enlistment early in 1917. Captain McLaren looked after the operation of ships at seven different ports in France, namely, La Rochelle, St. Nazaire, Nantes, LaPallies, Havre, Brest and Rochefort.

Colonel McCrea's Address

There had never been such a thing as a railroad transportation department in the United States Army. It had its inception when four or five men went to France in July, 1917. These men made a complete survey of the situation, which resulted in the preparation of what is known as "Requisition Number Six," being a list of materials and supplies that called for an expenditure of something like \$400,000,000. And at the end of a year not a single item was found in that long list which wasn't needed and didn't have a distinctive part in the machinery of the transportation department.

We didn't build any separate railways in France, although many people here have been led to believe that we did. Our contribution was terminals, yards, and side-tracks, equal to a new line about 1,000 miles in length, with one important cutoff. With the exception of a few small branches, the French railroads are all double-tracked. There were plenty of French-built railroads, and we found them in pretty good physical condition, but there was a scarcity of men to operate them. The young men were doing their bit on the battlefields, but the men around middle age left in service did excellent work. The women of France also deserve great credit. They fired engines, did braking, and performed some of the hardest kind of manual labor in the shops.

By our arrangement with the French, we were to supply trainmen to move a tonnage equivalent to that which the American army would need. For every American serving in France we had to move an average of fifty pounds a day. This included coal, engineering materials, food, clothing and ammunition. We handled not only our own supplies, but also a great volume for the French as well. They reciprocated, moving American supplies over their lines to different sectors where our troops were fighting. There was magnificent co-operation on both sides.

The plans of the Allies required that by July, 1919, the United States should have three and a half million men in France, fully equipped and trained to do battle. For every hundred fighting men we had to have between 15 and 20 service-of-supply troops, to do other kinds of work. As many as 18,000 American troops landed at Brest in one day, and it was a gigantic problem to move these great hordes of men and their supplies, especially as we were continually handicapped with a comparatively small transportation force.

One of the fundamental reasons the American Expeditionary Forces did so remarkably well in France was their adaptability to almost any character of work, however

difficult. Of the transportation men few, if any, performed only the work which they came over to do.

There were many French railroad practices we did not fancy, I am frank to admit; but it would have been a tremendous mistake for us to go over there and insist upon introducing American methods. We had to adapt ourselves to conditions as we found them. We had trackage rights over all the French railways. On no two roads were the signal systems alike, and we had to prepare a book of rules whereby our men could run the trains. In this country the conductor is in charge of the train. In France the engineer has charge while the train is in motion, but when the train is not in motion a so-called "pilot" is the responsible head.

When the armistice was signed we were moving 40,000 tons of freight daily, and were planning to move a daily tonnage of 100,000. For about a week following the cessation of hostilities, everybody was celebrating the victory, but the transportation department's work could not be interrupted. Our job really had only just begun. Our hardest work was done between November 11 and the middle of January, when we had to get the Army of Occupation up to the Rhine. And even then we were not through. The Allied soldiers on the Rhine had to be fed, which meant that several trainloads of food had to be despatched every day and hospital trains had to be operated; and there was also the task of feeding the German population in the occupied territory.

Orders of Regional Directors

VICTORY LIBERTY LOAN.—The Northwestern regional director in a telegram, file 52113 to Northwestern railroads states that where payments on account of the fourth Liberty Loan have not been completed, it will be permissible to defer deducting from the payrolls on account of the Victory Liberty Loan until payments on the previous loan are completed; but the deductions on account of the Victory Loan must begin not later than the payrolls for September, 1919. The Eastern regional director has issued a similar notice.

Sale of Secondhand Rail to Industries.—Circular 199, canceling Circular 8 of the Southwestern regional director states that it will be satisfactory for relay rail to be sold for the construction and repair of industry tracks at \$40 per gross ton.

Brakes on U. S. R. A. Hopper and Gondola Cars.—Order 194 of the Southwestern regional director requires inspectors to make a special inspection of all United States composite gondola standard and hopper cars, and that where these cars are found without sheave wheels on the brake shaft end of the hand brake rod to send these cars to shop, regardless of ownership, and have the brake arrangement changed to conform to the approved standard.

Campaign Against Venereal Diseases.—By circular 200 the Southwestern regional director permits state boards of health to post placards advertising the free government and state clinics for venereal diseases. These placards must not be placed in reading rooms or in cars.

Use of Headlight Generators.—Circular 203 of the Southwestern regional director reminds enginemen that by keeping water gages and shields clean or by slightly relocating the lamps of these water gages, it will not be necessary to run headlight generators during daylight as is now being done in many cases.

Records of Shipments of Distilled Spirits.—Supplement 1 to Order 88 of the Southwestern regional director states that records ordered kept by Order 88 of shipments of distilled spirits (no longer required) should be carefully retained and

be made accessible to revenue officers at points where such officers have not already inspected them. The Eastern regional director, by Circular 600-70A687, issuing the same instructions.

Repairs of Short Line Cars.—Supplement 2 to Circular 49 of the Northwestern regional director similar to Circular 500-14-5A669 of the Eastern regional director. (*Railway Age*, April 18, page 984).

Revised Industry-Track Agreement.—Supplement 9 to Circular 33 of the Northwestern regional director contains two forms covering standard track agreements which have been revised in accordance with the terms contained in Supplement 1 to General Order 15. This form of agreement is subject to modification by the federal manager in special cases.

Reports of Air Brakes Cleaned.—The Eastern regional director by Order 1801-131A691, calls for regular monthly reports, beginning with April, showing the number of freight car air brakes overhauled, with a statement showing the ratio of number cleaned to the number of freight cars owned.

Rail and Lake Freight.—The Eastern regional director, by Circular No. 600-4-121A688, advises federal managers of the arrangement for delivering freight to boats at Buffalo. During this season the Cleveland & Buffalo Transit Company and the Great Lakes Transit Corporation will load vessels at the New York Central dock at Ohio street; the Detroit & Cleveland Navigation Company will load at the Delaware, Lackawanna & Western dock; and the Lehigh Valley Transportation Company at the Lehigh Valley dock. Attention is called to the fact that freight which is sent over the roads making these direct connections will avoid additional switching; but shippers must be allowed the right to route their freight as they please. Freight is not to be forwarded by lake unless so ordered by the shipper.

Passes for Brotherhood Chairman.—The Eastern regional director, by Circular 2100-13A689, advises federal managers that they may apply to the director of operation, Washington, for annual passes over connecting roads for general chairmen of committees of employees' organizations where such passes are necessary to enable a chairman to make a short cut from one part to another of his own territory.

Express Agents' Telegrams.—The regional director, Eastern Region, by circular No. 304-11A693, advises federal managers that the agreement with the American Railway Express Company permitting agents of the express company to send telegrams free on the railroad wires, is intended to allow this privilege only between points on the same railroad.

Passes for Representatives of Clerks.—The regional director, Eastern Region, by circular No. 2100-13A694, quotes an order from the director of the Division of Operation authorizing the issuance of free transportation to the general chairmen of the Brotherhood of Railway Clerks on the same basis as to general chairman of other brotherhoods, regardless of whether there is or is not a contract between the clerks and the railroad on which these chairmen are employed.

Passes to Brotherhood Conventions.—The regional director, Eastern Region, by circular 2100-37A695 promulgates the order of the director of the Division of Operation, dated April 15, authorizing free transportation for members to annual conventions of the conductors, the trainmen and the firemen, to be held within the next two months. Transportation is to be granted as in the past, and it is suggested that the federal managers, to save time, send their applications direct to Washington. This privilege includes also the delegates to the Ladies' Auxiliaries.



The New Retiro Station of the Central Argentine—the Largest in South America

The Railroad Development of the Argentine

**The Largest Market for Railway Equipment in South America—
Regulation, Labor, and Taxation Big Problems**

IN TWO PARTS.—PART II

SUPPLIES OF ALL KINDS have increased tremendously in price since the beginning of the war and have been hard to obtain at any price, but the increase in price and scarcity of fuel has contributed more directly than any other factor in increasing the cost and difficulty of operating the railways. Coal has risen in price from £1 10s. before the war to something like £10 in 1918; in 1916-17 the average price was about £5 or £6 a ton. In normal times the Central Argentine consumes annually about 400,000 tons; the Great Southern, 380,000; the Pacific, 280,000; the Western, 190,000; and other companies in proportion to their mileage and traffic. Not only has coal increased in price but the supply has been so limited that the railways have been forced to burn large quantities of wood.

It is estimated that the Great Southern, the Buenos Aires & Pacific, the Buenos Aires Western, and the Central Argentine together use approximately 3,000,000 tons of wood annually under the present abnormal conditions. In addition, the industrial enterprises burn 8,000,000 tons, and all this fuel must be brought down from a restricted area in the northern part of the republic. The carrying capacities of the lines serving this region are wholly inadequate, with the result that the Southern and some of the other systems having no wooded districts of their own to draw from have been unable to obtain sufficient wood at any price.

In 1915 the railways were authorized to raise their tariffs 10 per cent and in 1917 22 per cent. They announced a

third increase of 10 per cent to take effect May, 1918, but were refused permission by the government to put this last into effect. According to the terms of the mitre law the government may not interfere in the rates which a company charges so long as its dividends do not reach 6.8 per cent on the recognized capital. The companies contend that since their dividends have not reached any such figure, and are unlikely to for a long time to come the government has overstepped the prescribed limits. They maintain further that this 10 per cent increase was promised them in compensation for the higher salaries granted their employees at the settlement of the strike in 1917 and the shorter working day which necessitated a larger working force. The government refused to allow the new rate on the grounds that the companies had failed to give the required four months' notice and that it would impose an unduly heavy burden on the producers of the nation, especially the wheat growers selling their crops to the allied governments at a contract price.

The various companies submitted detailed reports setting forth their reasons for asking this increase. All their expenses, especially wages, taxes, and cost of fuel, have been augmented during the last four years while their volume of traffic has not changed materially. The export freight has grown in volume but this has been counter-balanced by the falling off in import freight. The Southern claims in its report that the 22 per cent increase failed to add to the

gross receipts the 5,792,054 gold pesos estimated; that the proposed supplemental 10 per cent would only yield an additional 2,951,957 gold pesos; and that the working expenses were greater by 13,054,435 gold pesos. Hence, a rate 25 per cent higher instead of 10 per cent would be necessary to cover the deficit entirely.

Improvement in Financial Outlook

While not disposed to underrate the seriousness of the present unsettled labor conditions, the uncertainty as to the character of the proposed railway legislation, and the probability of the continued high cost of supplies, recently published reports of many of the Argentine railways indicate the hopeful feeling with which the shareholders are looking forward to the coming year. The 1917-18 net returns have in general been a trifle better than those of 1916-17, due to the 22 per cent rate increase allowed November, 1917, and this has been reflected in a slight rise in recent quotations of stock. The grain crop on which the railways are chiefly dependent for their export freight was large in 1917-18 and promises to be almost as good for the present year. The ending of the war means the gradual easing of the shipping situation which will result in larger volume of import freight traffic for the railways.

The following quotations of railway stocks which are listed on the London Stock Exchange represent the high and low prices for 1913 and the opening and closing prices for

available. A recent issue of the Review of the River Plate states that the minister of finance has been authorized to transfer the sum of 12,000,000 paper pesos to the administrator of state railways. One-half of this amount is to be utilized in canceling the outstanding liabilities of the administration and the remainder in the acquisition of materials urgently required for the state lines. It is understood

Name of company	Gross receipts		Per cent consumed in working expenses		Dividends	
	1916-17	1917-18	1916-17	1917-18	1916-17 Per ct.	1917-18 Per ct.
Central Argentine	£5,246,626	£6,184,089	68.71	73.94	1	2
Great Southern	5,734,141	5,838,441	64.06	76.16	4	2
Pacific	4,421,368	5,269,979	65.98	65.80	None	None
Buenos Aires West'n.	2,504,939	2,858,639	66.88	75.68	3	2
Cordoba Central	1,565,292	1,709,227	73.77	75.16	None	None
Entre Rios	636,526	847,797	64.38	62.32	None	None
Central of Buenos Aires	297,752	369,853	54.73	55.05	...	...
Argentine Northeast	389,100	460,000	....	84.80	None	None
Rosario Puerto Belgrano	.....	*2,317,330	*2,587,117	85.02	82.77	....

*Argentine paper pesos.

that the transfer will be effected at the rate of 100,000 pesos a day.

Extensive Improvement Policy Halted by War

Argentina's railway mileage has only increased from 21,000 miles at the beginning of the war to 22,000 in 1919,



Railroad Station at Goya

1918. They show the very real depreciation in the selling price of these stocks since the war, but they show also that during the last year the movement has been appreciably upward. With a single exception, the closing price for 1918 is higher than the opening price.

Name of company	1913		1918	
	High	Low	Opening	Closing
Buenos Aires Great Southern, ord...	130	109	72 1/4	72
Buenos Aires Western, ord.....	128	109	71	73 1/4
Central Argentine, ord.....	112	100	59	66
Buenos Aires & Pacific, ord.....	92	64	39	58 1/2
Central Cordoba, ord.....	54	39	11 1/2	17 1/4
Entre Rios, ord.....	78	54	22 1/4	41

The table in the next column gives the amount of gross revenue for the years 1916-17 and 1917-18, the percentage consumed in working expenses, and the dividends on ordinary stock, wherever it has been possible to obtain these details from published company reports.

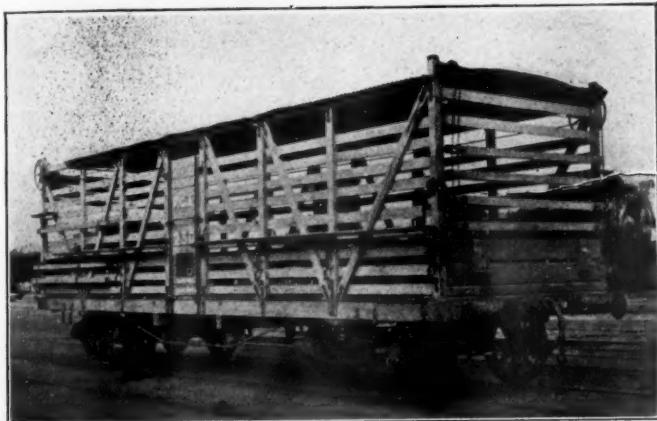
Los Ferrocarriles del Estado usually show an annual deficit, but in 1915 and again in 1916 they showed a slight profit on the capital investment. No later reports are now

and some of the companies have allowed their concessions for extensions to lapse entirely. However, considerable sums have been spent in the improvement of roadbeds, the double tracking of main lines, erection of new and larger stations, the electrifying of suburban lines radiating from Buenos Aires, and the improvement of port facilities and workshops. Some of the companies have been severely criticised by their stockholders for the elaborate scale on which they have pursued this policy of improvement, and it is impossible to predict whether or not the railways will resume their pre-war plans for expansion. In the case of the European companies it will depend on the price of money at home as well as on the form which the proposed railway legislation in Argentina will take and the solution of the present labor problem. Almost without exception the companies have increased their reserve funds during the last four years, although they have been forced to pay very small or no dividends at all, and they are anxious to retain and expand their Argentine holdings, provided they are insured sufficient protection by the government, as well as a chance to make a reasonable profit on their capital investment.

Electric Suburban System

The Central Argentine opened its new passenger station in Buenos Aires in 1915 and inaugurated its electric suburban line to Tigre in 1916. The passenger terminal, the Retiro, holds the distinction of being the largest in South America and is said to handle 1,900 passenger trains weekly. The branch to Tigre is a third-rail line, modern in every respect, and is operated by power from the Central's own plant. This company began an elaborate plan of expansion, which has been temporarily suspended during the war.

The Buenos Aires Western has a large passenger terminal in Buenos Aires, the Once, and has electrified a portion of its suburban system. From the point of view of economy



Cattle Wagon on the Transandine Railway

the freight tunnel recently completed by this company is interesting. It connects the docks with the company's station in the heart of the city, nearly 3 miles distant, and cost about 5,000,000 paper pesos. The original plan was to use only electric locomotives, and an order had been placed with a German firm to supply these, but this order was canceled, and at present steam locomotives are being used. About 100 cars pass through the tunnel daily. The company has also built a tunnel which affords direct connection between its own passenger terminal and a station of the Anglo subway and has plans for the construction of several branches and feeders.

The Great Southern, a third company which serves suburban Buenos Aires, has not electrified any portion of its line yet, but had made plans to do so prior to the war. It has a large passenger terminal in Buenos Aires, La Plaza Constitucion, and the largest freight station in South America, La Sola (also in Buenos Aires), which has capacity for storing 230,000 bags of grain and 2,000 tons of other freight. An extension is projected from Zepala, where connection will be afforded with a line to be built by the Chilean State Railways, thus forming a transcontinental line with easy grades. A second extension is planned to run south from Darwin to the port of San Antonio, where it will connect with the Patagonian State railways. Important irrigation works are being carried out in the Neuquin and Rio Negro valleys.

Plans for Further Expansion

The Buenos Aires & Pacific pursued a more aggressive plan of expansion during the last few years prior to the war than any other line in the Argentine. The land along its so-called Patagonas Extension is being irrigated, and every effort is being made to attract colonists. At present the fixed charges of this system are relatively high, and its financial condition not quite so assured as that of the other large companies, but in general its prospects are considered good. Should there be an influx of immigrants from Europe within the next few years, as seems likely, this road will benefit materially.

The Argentine Northeastern has a large projected mileage and serves a rapidly developing section. A considerable portion of its present mileage was opened just prior to the war. The Entre Rios states in its latest report that it does not intend to undertake any construction work for some time.

The Central Norte and the Transandine are the only two railways in the Republic whose construction has been complicated by engineering difficulties. The Central Norte reaches an altitude of 12,000 feet at Abra Tres Cruces, the Transandine over 10,000 feet at the Chilean border.

This latter line has never fully accomplished its mission of forming a quick and easy means of carrying freight from ocean to ocean owing to the forced suspension of traffic during the stormy winter months and to the excessively high freight rates. Conditions have been considerably improved on the Argentine portion of the railway during the last few years. There has been some discussion as to the advisability of joining the Chilean and Argentine portions under a single management, but nothing has been done so far. The Central Norte serves a portion of the Chaco, little developed as yet and comparatively uninviting.

Proposed Fusion with Government Lines—State Development Railways

There has been some discussion recently of the fusion of the Central Cordoba with the government lines of the north or the purchase of the Central Cordoba by the government in order to obtain a means of access for these roads into Buenos Aires. This would result in competition of government with privately owned railroads, and would be a decided departure from the past policy in regard to railway ownership.

The state development railways include two in the Chaco and the three Patagonian State lines. The Formosa-Embarcacion system will be about 437 miles long when finished,



The Train Shed of the New Retiro Station

The shed is 787 ft. in length and the steel arches have a span of 160 ft. with a maximum height of 84 ft. above platform level. (Note the third rail and the multiple unit equipment on the left.)

and will exploit the little-developed territories of Chaco and Formosa. The Diamante to Curuzu Cuati road, as planned, will extend from Diamante on the Parana River in the Province of Entre Rios westward to Crespo (21 miles), from which point the Entre Rios will be used to Hasenkamp. From here the line will extend northwest to Curuzu-Cuati in the Province of Corrientes, a point on the Argentine Northeastern. About 106 miles have been completed, and eventually this road will open a rich and extensive territory for development.

The plans for the Patagonian State railways call for about 1,243 miles of track, 580 of which are now open for traffic.

either full or provisional. When finished, this system will consist of two lines, the San Antonio and the Comodora Rivadavia, across Patagonia from east to west, and a third extending from Puerto Deseado in the Territory of Santa Cruz northwest across the Comodora Rivadavia to the western terminus of the Port San Antonio Railway. The San Antonio line, which now reaches the foothills of the Andes, may later be extended across the Andes to connect with the Chilean State railways at Osorno. The Comodora Rivadavia will eventually reach Lake Buenos Aires on the Chilean boundary.

The Central of Chubut is the only privately owned road which operates wholly in Patagonia. This company plans to extend its present short line across the republic to the Andean foothills. It owns an iron pier at Port Madryn in addition to the railway.

The bulletin of the Pan American Union for August, 1918, reports that Juan B. Lalucat & Co., of Buenos Aires, have petitioned the national government for a concession authorizing the construction of about 180 miles of railway to extend from Malabriga, a point on the French railway of Santa Fe, to Anatuya, a junction of the State railway system in the Province of Santiago del Estero. The road, as planned, runs northwest through a quebracho zone.

Argentina as a Market for Railroad Supplies

The Argentine market for railway supplies of all kinds is varied and extensive. The electric suburban systems operated by the Central Argentine and the Western necessitate an entirely separate equipment, and the large freight terminals and the extensive docks at Buenos Aires require their own special equipment.

The following table shows the quantity of rolling stock owned by each of the large companies in 1913, the last pre-war year:

Railroads	Locomo- tives	Pas- senger and other		Freight cars	Total
		cars	cars		
Central Argentine	620	651	21,233	22,504	
Buenos Aires Great Southern	627	786	15,200	16,613	
Buenos Aires & Pacific	742	409	12,651	13,802	
Buenos Aires Western	327	348	9,747	10,422	
Cordoba Central	267	323	6,960	7,550	
Central Norte	387	206	6,537	7,130	
Province of Santa Fe	160	147	5,604	5,911	
Province of Buenos Aires General Railroad	104	98	2,566	2,768	
Entre Rios	84	94	2,168	2,346	
Argentine del Norte	66	100	1,829	1,995	
Argentine Northeastern	68	74	1,136	1,278	
Rosario Puerto Belgrano	44	28	1,094	1,166	
Buenos Aires Central	38	25	1,016	1,079	
La Plata & Meridiano Quinto	21	25	923	969	
Buenos Aires Midland	34	33	869	936	
Central Railway of Chubut	6	7	86	99	
State Development Railways	...	...	...	...
Total	3,595	3,354	89,619	96,568	

It will be noted from this table that the Central Argentine, the Southern, and the Buenos Aires & Pacific normally require the largest amounts of rolling stock. These three companies maintain extensive shops in the Argentine where they not only do repair work but manufacture a considerable amount of rolling stock. The Central Argentine has large factories at Rosario and Perez, where it has been building cars for several years. The shops of the Southern are situated at Talleres, where, among other railroad equipment, a special type of postal car is made. The Buenos Aires & Pacific has been building a distinctive ventilated fruit car for fast service between San Juan, Mendoza, and Buenos Aires.

The administrative offices of the large English companies are, without exception, situated in Buenos Aires, but the executive officers are English and prefer to make their purchases in England when possible. This fact explains the predominant place occupied by England among the countries sending railway equipment to the Argentine during the five-year period (1909-1913) immediately preceding the war.

Steady Decrease in Imports

The following table gives the total amount of railway supplies imported during this period by country of origin. Since the tariff valuation is a fixed amount for each article, increase or decrease in these figures represents a difference in the amount of imports and not price fluctuations.

Countries of origin	Locomo- tives	Passen- ger cars	Freight cars	Rails, steel Metric tons	Rails, used Metric tons	Other Gold pesos
Number	Number	Number	Number	Metric tons	Metric tons	
United Kingdom	612	372	10,957	426,124	161	26,924,577
United States	50	160	2,016	198,830	...	1,075,661
Germany	525	26	1,576	289,889	1,340	2,657,117
Belgium	69	27	7,230	80,246	...	2,685,042
France	15	6	588	40,685	38	754,469
All other countries	16	8	72	37,903	41	236,609
Total	1,287	599	22,439	1,073,677	1,580	34,333,475

No detailed statistics for 1916, 1917, or 1918 are now available, but the following table compiled from the official Argentine statistics for 1913-1917 demonstrates the continued decrease in total import during successive war years:

Year	Locomo- tives	Passen- ger cars	Freight cars	Rails, steel Metric tons	Rails, used Metric tons	Other Gold pesos
Number	Number	Number	Number	Metric tons	Metric tons	
1913	234	98	5,370	156,592	29	5,041,415
1914	189	69	68	84,936	13	4,116,622
1915	29	28	...	13,391	21	1,690,786
1916	30	6	24	1,535	25	1,261,908
1917	2	5	28	640	14	822,065
Total	484	206	5,490	257,094	102	12,932,796

Since imports, not only of rolling stock, but of miscellaneous supplies of all kinds including raw materials have been so greatly restricted for the past four years, the equipment of all the roads has become very materially depleted. The Patagonian State railways are reported to be especially hampered by lack of equipment. The Entre Rios, according to the latest company report, is in the market for one or more new train ferries. The annual purchases of the government railways are said to amount to about 5,000,000 paper pesos. All the companies report that in view of high prices, difficulty of obtaining supplies, and unsettled conditions in the Argentine, purchases have been reduced to the minimum.

War Cost of Railway Equipment

FOR THE INFORMATION of the Liquidation Commission, the office of the chief of engineers has prepared an estimate of the costs of railroad equipment shipped to the A. E. F. computed on the basis of 1914 prices. The government actually paid from two to two and a half times the pre-war costs.

UNIT COST OF STANDARD GAGE RAILWAY EQUIPMENT COMPARED WITH PRE-WAR COST

	Shipped to A. E. F.	Unit price	Actual cost in per cent of pre-war cost
		Pre-war	Actual
Locomotives—			
Consolidation	1,306	\$17,500	\$42,966
Gasoline	10	9,350	22,000
Saddle tank	30	4,500	9,700
Total	1,346	.....	.....
Cars—			
Tank	675	\$1,367	\$3,397
Gondola, l. s.	3,429	1,090	2,340
Flat	1,900	982	2,107
Box	7,299	1,290	2,755
Refrigerator	950	1,649	3,489
Gondola, h. s.	2,650	1,155	2,430
Dump	500	1,026	2,108
Ballast	400	1,454	2,987
Box, with cap.	500	1,366	2,770
Total	18,303	.....	.....

COST OF STANDARD GAGE RAILWAY EQUIPMENT COMPARED WITH PRE-WAR COST

	Pre-war cost	Actual cost	Actual cost in per cent of pre-war cost
Locomotives	\$3,083,500	\$56,524,870	245
Cars	22,346,745	48,822,100	214
Total	\$45,430,245	\$104,446,970	230

Securing the Maximum Efficiency in Train Loading*

High Ratio of Actual Tonnage Moved to Rating of Engines.
Heavy Loading Promotes Fuel Economy

By T. H. Williams
Assistant General Manager, Southern Pacific

ONE OF THE FIRST FACTORS to be considered in the subject of train and engine loading is organization. Under the plan of organization effective on the Southern Pacific, the superintendent is practically the general manager of his division, and he is looked upon in this light by the executive officers. He is the responsible head and is the man who is looked to for results. The staff officers on a division of the Southern Pacific consist of the superintendent, one or two assistant superintendents (as the needs of the business justify), from one to three trainmasters, a chief despatcher, a master mechanic, a master car repairer, a road foreman of engines, a division engineer, a signal supervisor, a bridge and building supervisor, roadmasters, and a division storekeeper.

In the movement of the business as it relates to train and engine loading, the officers who are principally concerned as an aid to the superintendent are the chief despatcher and the master mechanic. The first is charged with the responsibility for the handling of the power, and the second with the responsibility for the power being in good repair. The assistant superintendent and trainmasters act as aids to the chief despatcher in assisting in loading the engines to a point somewhere near their efficiency and seeing that the trains move promptly over the division. The usual practice is to charge the chief despatcher with the responsibility of loading the train with such tonnage as will present a proper engine efficiency. The assistant superintendent and trainmaster should encourage every effort on the part of the chief despatcher by aiding him in the support of this work. Good progress is usually measured by the amount of interest that the staff officers take in this or in any other subject, and when the chief despatcher, who really carries this load, finds his superiors seeking every avenue in which to assist him, the results are always in favor of a division organization of this kind.

Importance of Yard Organization

The chief despatcher, in carrying out a program of train service, and in ordering the trains from each yard, has to rely upon the general yardmaster and his assistants. It is therefore necessary that the general yardmaster, the chief yard clerk and the entire yard clerical organization manifest some spirit of interest in the make-up of the trains with the tonnage as ordered by the chief despatcher, and the despatching of these trains from the initial terminals on time is necessary. A poor start of any train is frequently met with a very poor ending. Initial delays to tonnage trains in terminals will not exist in a well organized yard, and are a handicap to the chief despatcher's efforts.

Locomotives are rated to haul a given tonnage and this rating is arrived at by a series of tests, developing the number of tons that each engine can haul and maintain schedule time. The ratings of these engines vary, of course, as the business is moved over the various grades, but the ratings show the maximum capacity of the engine to haul a given tonnage over each freight district of a division, and the engine is given credit for a 100 per cent performance when hauling the tonnage for which it is rated.

To bring out graphically the saving that can be accomplished in train and engine mileage by reason of increasing train and engine loading, consider the actual figures as reflected in the statistics of the results accomplished on the Tucson division during the month of December, 1918, as compared to the same month of 1917. This division extends from Yuma, Arizona, to El Paso, Texas, with a main line mileage of 560 miles, and has a decided preponderance of eastward business. In the direction of the preponderance of business on the main line during the month of December, 1918, this division handled an average of 1,692 tons per locomotive against 1,463 tons during the same month of 1917, an increase of 229 tons per locomotive, or 15.7 per cent. By reason of this splendid increase in engine load the engine efficiency was increased from 86 per cent in December, 1917, to 94 per cent in December, 1918. During this same period, in the same direction the division handled 216,152,000 gross tons one mile as against 238,903,000 gross tons one mile during the same month of the previous year, a decrease of 22,751,000 gross tons, or 9.5 per cent. This amount of business was handled with 99,186 train miles as against 136,675 train miles in the same month of the previous year, a decrease of 37,489 train miles, or 27.4 per cent; and with 127,727 locomotive miles as against 163,258 locomotive miles, a decrease of 35,531 locomotive miles or 21.8 per cent. In other words, by reason of increasing the engine load 15.7 per cent, and the engine efficiency from 86 per cent to 94 per cent this division was able to handle a decrease of only 9.5 per cent in business with a decrease of 27.4 per cent in train miles and 21.8 per cent in locomotive miles.

Waste of Power Due to Light Train Loading

This year, taking the business as a whole in the direction of the volume of traffic, every train moving over this 560 miles of main line during that month hauled 94 per cent of its full tonnage rating. In other words we lost only 6 per cent efficiency on the engine of each train run. In the same month of the previous year each engine hauled 86 per cent of the rated tonnage, or in other words the division failed in the full utilization of its power by 14 per cent. Let us say for argument that a division of any railroad is only obtaining 75 per cent efficiency in its engine load in the direction of the preponderance of its business. Here is a wastage of 25 per cent in the utilization of the power, and, considering the fact that a heavy type freight engine costs in the neighborhood of \$90,000, I leave to your own conclusion the waste of power on a machine that is utilized at 75 per cent of its efficiency.

It is not possible for a division that originates a large tonnage to compete in tons per engine and in engine efficiency, with a desert division that originates very little business. The large number of local freight trains run on each freight district of the division that originates considerable business, must be started each day with a train load that will permit them to pick up and set out cars at stations between terminals, and these trains when pooled with the through tonnage trains over this division, pull down the average train or engine load and detract just that much from engine efficiency. For example, our Coast di-

* From a paper presented before the Pacific Railway Club on February 13, 1919.

vision in the year 1918 loaded 167,000 cars, or 4,000,000 tons of commercial freight. It is not hard to realize the large number of local freight trains necessary to assemble a business of this volume. A desert division originating little business on account of the character of the country has the opportunity of moving its trains intact with little change in their make-up en route, and enjoys the opportunity of obtaining a splendid engine load and engine efficiency.

Heavy Engine Loading and Fuel Economy

Our monthly statistics show the amount of fuel oil saved or lost in freight service on a ton mileage basis as compared to the same period in the previous year, and while we always conduct a very intensive campaign of education among our enginemen on fuel conservation, the large part of any saving that is made can be directly charged to an increase in the average tons per locomotive. Contrary to the general impression that prevails that less fuel is consumed by running light trains at high speed, when fuel consumption is figured on a ton mile basis, which is the only fair way of showing this consumption, our statistics have proven conclusively that increasing the engine load is the biggest factor in railroad fuel conservation.

For example, consider the performance of the Tucson division in this respect for the month of December, 1918, as compared to the same month in 1917. Due largely to the increase of 229 tons in average tons per locomotive this division in December, 1918, consumed an average of only 13.38 gal. of oil per 1000 gross ton miles, as against 16.29 gal. per 1000 gross ton miles in December, 1917. This resulted in a saving of 1,024,554 gal. of oil on a ton mile basis as compared to the consumption during the same month of the previous year. At the current price of oil, this means a saving of \$36,128 on this one division alone. Of course, we must attribute some of this saving to mechanical improvements, such as the superheater; also to the campaign of education among the enginemen and the co-operation which we have received from these employees, but as stated before, the major portion of this saving has been effected by the splendid increase that has been made in the average tons per locomotive.

Daily Records of Train Loading

Our company furnishes statistics as a guide to operation, and although these statistics are furnished with promptness, it is not necessary for the divisions to wait for the auditor's figures to keep abreast of their showing in train and engine loading. The divisions that are successfully handling a good engine load, are the ones that are tabulating in statement form from day to day the number of tons handled in the direction of the volume of business, taken from their train sheets, and the average tons per engine, showing how their performance today compares with their record on the same day of the previous year.

High speed freight trains means light loaded locomotives and detract from engine efficiency and increase the consumption of fuel. One of the discouraging features that operating officers are called upon to contend with is the burden placed upon them for fast freight train service. These demands are usually the result of an endeavor to meet some competitive feature of service, and while appreciating the necessity, from a competitive standpoint, for the establishment of such fast schedules, it must be understood that wherever conditions of this kind are met we throw away the opportunity of building up an engine load and engine efficiency that means increased net returns in the operation of the property. It is not my experience that the shipping public is unreasonable in its demands for service. A freight train schedule arranged with a view of giving to the shipper and receiver of freight a dependable service and at the same time framed by the railroad with a view of maintaining

the efficiency of its power, is a condition that can be covered to the satisfaction of both the shipper and the railroad. In other words a condition of this kind is possible, and where it is in effect works out to the mutual advantage of both parties.

Division Secures 100 Per Cent Engine Efficiency

No better illustration of what can be accomplished in full train and engine loading could be given than the record obtained by the officers of our Los Angeles division during the second week of January. On the freight district from Indio, Cal., to Yuma, Arizona, a distance of 122 miles, this division hauled an average of 2321 tons per locomotive, as against 1845 tons per engine for the same week in 1918, an increase on each train run of 476 tons per locomotive, giving the division 100 per cent engine efficiency this year as against 86 per cent last year.

While this freight district is in desert territory and originates very little if any business and the conditions are ideal for obtaining splendid engine efficiency, these favorable conditions do not detract from the fact that this splendid increase in engine load was obtained only through the undivided attention and individual effort of the staff officers on that division. The division handled a large number of orange, perishable and high-class manifest trains, on which it is necessary that schedule time be closely observed, and it was only through system and method that the officers were able to load up their fast freight trains, together with drag freight trains, to the extent of finally obtaining 100 per cent efficiency on the tonnage hauled by each engine during this week. To illustrate further the efforts of the organization on this division, during this second week in January each engine run on the four freight districts of the division, in the direction of the volume of business, eastward, obtained 96 per cent efficiency in tons per engine, which was the best record made, or the highest percentage of efficiency of any division on the system.



From the Macon Telegraph

"Cheer Up," Says Robin Redbreast

Treating Water Reduces Boiler Troubles

Great Northern Has Found Installation on 1,100
Miles of Main Lines Yields Excellent Results

By C. Herschel Koyl

Engineer of Water Service, Great Northern, St. Paul Minn.

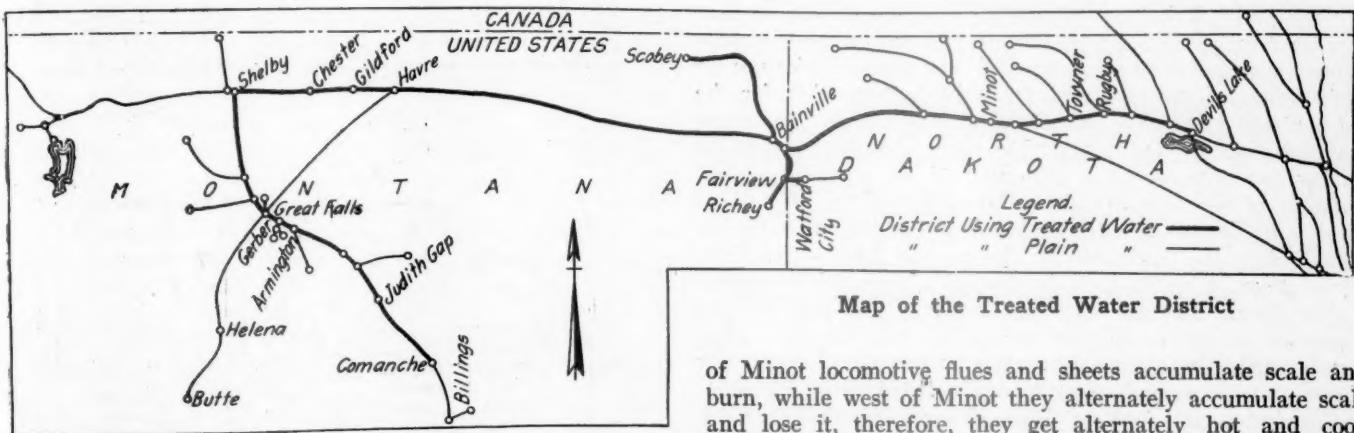
DURING THE PAST six years the Great Northern has been developing a system of water treating adapted to its needs. Of this the following is a brief description, with some account of the waters, treating plants, methods of inspection, and results.

The Great Northern crosses a strip of country 600 to 700 miles wide, just east of the Rocky mountains, which receives less than the average rainfall and the waters of which contain more than the average dissolved mineral water, particularly of the sodium salts. The trouble used to come not alone from the amount of matter dissolved in the water, but from its variety, because any boiler will leak and foam if it receives alternately hard water and alkaline water. The principal work of the water treating plants has been to reduce all of these waters to a common standard of hardness and alkalinity, and for this essential we have installed a plant at every water station on the treated water district.

Work was begun in 1912 and now, in 1919, we have more than 1,100 miles of exceedingly bad railroad water con-

cause deep waters are so laden with sodium salts as to be practically unusable.

The waters of the Great Plains of North Dakota and Montana are divided into two classes at a line running roughly north and south through Minot, S. D. East of this line the deep waters are charged mostly with sodium chloride (common salt); west of this line with sodium sulphate (Glauber's salt); and in each the charge is so heavy, several hundred grains per gallon, as to make them impossible as railroad waters. Of the surface and sub-surface waters, all contain calcium bicarbonate and nearly all magnesium bicarbonate; while east of the Minot line they contain also calcium and magnesium sulphate, but west of the Minot line sodium bicarbonate. At Minot these substances are so nearly balanced that in summer the Mouse river contains 3 grains per gallon of sodium carbonate and in winter 3 grains per gallon of magnesium sulphate. It is understood that this is a general classification, there being a few individual exceptions; but east



Map of the Treated Water District

verted into water satisfactory in all respects for its content of sodium sulphate. We have practically abolished scale, leaks due to water, and clogging of the injector and branch pipes. We have not altogether abolished foaming (due to the accumulation of soft sludge deposited in the boiler from the 3 grains per gallon of calcium carbonate unavoidably left in the water when treated cold), but we seldom hear about it. We have not abolished pitting and grooving (which are not produced by chemical action of the water), but we have had a set of tests running for some months from which we hope to be able shortly to add something to the present knowledge on this subject.

The Waters

Many interesting and important problems are presented on a road having so many kinds of water. In Minnesota, surface water of fair quality is plentiful in rivers and lakes, and when these are not convenient to the railroad it is generally possible to get usable water in wells of moderate depth. West of Minnesota to the Rocky mountains, railroad water *must* be taken from the surface or near it be-

of Minot locomotive flues and sheets accumulate scale and burn, while west of Minot they alternately accumulate scale and lose it, therefore, they get alternately hot and cool, alternately expand tight in the flue sheet and contract from it, and therefore leak.

In each state there is also some excellent water flowing south in gravel beds from isolated mountain peaks—the Turtle mountains on the Canadian border of North Dakota and the Sweetgrass hills on the Canadian border of Montana. In Dakota, just below the surface soil, is clay of great depth, but lying in east and west waves so that the troughs of the waves run north and south. In the course of years, these troughs have been nearly filled with gravel and sand from the weather worn peaks of the Turtle mountains, and all year long these gravel veins carry excellent water from the mountains south through Dakota. I do not know the total number of these troughs nor their length, but I am sure of four which are 60 miles long each, and there are numerous shorter ones. In Montana somewhat similar conditions exist about the Sweetgrass hills.

Then we have a most interesting set of waters in shallow lakes which we use as reservoirs. These lakes are crowded with weeds and small fish. The water is supplied by melting snow and rain. In summer, weeds and fish are growing and the quality of the water is fair; but toward

winter organic decay sets in, of which the product is marsh gas, and in hard water eventually hydrogen sulphide. Before ice forms, this gas escapes to the air; but later the escape is cut off and great concentration takes place in the water, with results to the boilers which are very serious. Sweetwater Lake, so named by the Indians when the lake probably had a current, is our most striking example; and before we treated the water engines sometimes could not make the main line from the roundhouse, although now we use it with conspicuous success.

Nearly all of the surface waters are growing yearly harder because of the more extended plowing of nearby lands. Still, in springtime, most of them are fairly soft, though they grow gradually worse with the season until in late winter several of the reservoirs and at least one of the streams exceed 100 grains per gallon in hardness.

For locomotive purposes all these waters must be put into the same chemical condition, which is done except as to the varying content of sodium sulphate or chloride. It is the aim to maintain all treated waters, clear and colorless, at 3 grains per gallon hardness and one extra grain alkalinity due to sodium hydrate. The treating plants are of the "continuous" type with 40-min. mixing tanks fed from the bottom, the plants varying in working capacity from 20,000 gal. per hour at the principal stations to 5,000 on the branches. Each has an engine with two pumps controlled by clutches, the pumps operating simultaneously, with the raw water pump delivering to a water wheel which furnishes power for all the mixing devices and the treated water pump working at the same rate and delivering to the track tank.

The plant design has varied in detail from year to year as we have gained experience of railroad wayside conditions, but it has always retained the essential feature of a 40-min. mixing tank fed from the bottom—this for the reason that raw water and chemical reagents do not mingle by diffusion in any practicable time and that experience shows the necessity of a minimum of 25 min. mechanical stirring if the reactions are to be completed in the mixing tank and the precipitate deposited in the settling tank instead of in the track tank. The mixing tank is fed from the bottom so as to provide therein a mass of old precipitate for the cohesion of the microscopic and slow settling particles which are nascent during the last reactions when combining molecules are few. We do not use filters in any form, and for wayside work have discarded automatic regulating devices and feed the chemical boxes every hour. Each plant is housed and in winter is kept warm by a hot water system distributed about the lower walls.

We put a pumper at each plant; a water inspector in charge of each engine district, usually of 9 or 10 stations, and a general inspector in charge of 5 or 6 district inspectors.

The Chemical Treatment

The character of the treatment varies from plant to plant with the character of the water, and may vary at any plant from day to day; but all cases are covered by the use in proper proportions of hydrated lime, soda ash (sodium monocarbonate) and sulphate of iron (ferrous sulphate).

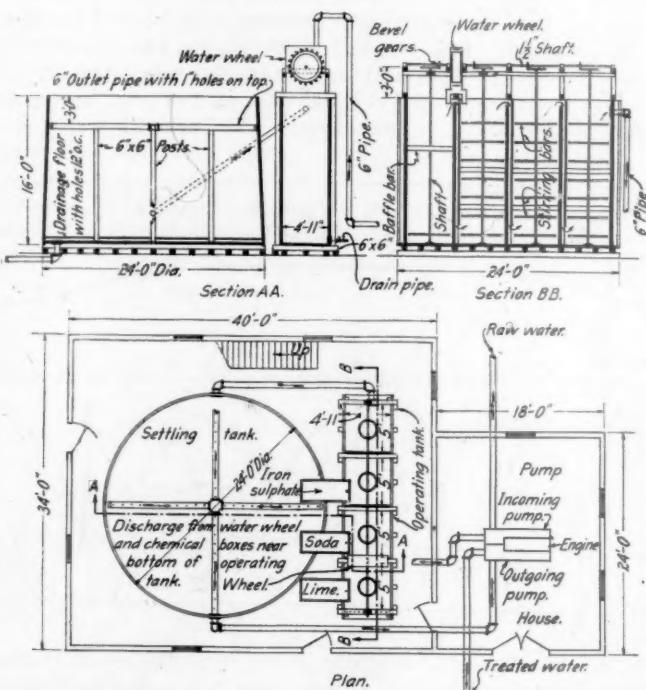
Hydrated lime is used to extract the carbonic acid, which brings about (1) the precipitation of the scale-making limestone carbonates (down to 3 grains per gallon or less), (2) the conversion of sodium bicarbonate into sodium hydrate, and (3) the weighting of the particles of light suspended mud and organic slimes. Soda ash is used to replace completely the scale-making limestone sulphate by non-scaling medium sulphate. Ferrous sulphate is used (1) for the treatment of the last 3 grains of calcium carbonate so that it will not clog the injector or branch pipe,

(2) for the conversion of caustic sodium hydrate into neutral sodium sulphate, and (3) for the further weighting and more rapid settling of particles of light suspended matter.

The treatment with lime was the gift to the world, in 1840, of Dr. Thomas Clark, professor of chemistry in Mareschal College, Aberdeen, Scotland; the treatment with soda ash was proposed by William Porter, an Englishman renowned for his advances in water softening, and the treatment with ferrous sulphate is my own device for preventing after-precipitation and particularly the clogging of the locomotive injector and branch pipe.

The Results

The first treating plant in 1911 was for demonstration purposes on the three stationary boilers of the roundhouse at Minot, N. D. These boilers had been fed from the hard and dirty water of the Mouse river; had been washed, one each day; had received the exclusive service of one boiler maker; had been dismantled, thoroughly cleaned and the flues retipped or renewed each summer, and, even so, had consumed \$10,000 worth of coal per year and delivered about \$5,000 worth of steam. The demonstration treating plant consisted of an old wooden water car, partitioned, fitted with



Plan and Sections of a Water Treating Plant

stirring apparatus, set in the roundhouse, connected at one end with the track tank and at the other end with the stationary feed water heater. The river water varied from a colored, muddy, comparatively soft water in spring to a comparatively clean water of 40 grains per gallon hardness in late winter. The treated water was kept throughout the year colorless, clear and at a hardness of 3 grains per gallon (calcium carbonate) and at a total alkalinity of 5 grains per gallon, the extra 2 grains being sodium hydrate.

The results in the boilers were immediate. In 10 days the shells and lower flues were clean, and when the loosened masses of scale above were broken so that they could fall through between the flues the whole boiler interiors became clean. Thereafter for a year the flues were black and the master mechanic reported for the year "no scale, no leak and not a tool touched to a boiler." During this year, too, there was no lack of steam for any purpose and

there was a hitherto unknown "snap" to the tools operated by compressed air. We burned as much coal as before, but we made twice as much steam.

Before the year was out instructions had been given for equipping with treating plants the 10 water stations for locomotives on the engine district between Devils Lake and Minot, and this was accomplished during the summer of 1912. During the winter of 1911, with untreated water, the Minot roundhouse handled an average of 600 engines per month and maintained a certain force for boiler repairs and washing; during the winter of 1912, the Minot roundhouse handled an average of 900 engines per month, of which 600 were from the untreated water sections and 300 from the treated water district between Devils Lake and Minot, and during this winter the crews for boiler repairs and washing were the same as during the winter of 1911. This looks as though the treated water boilers cost nothing for washing or repairs, but the fact was that the other boilers all took treated water at Minot before going to their hard water work and the effect of this one tankful of treated water every two days was quite marked in their repair and washing bills. The flue renewals at Minot roundhouse in 1911 with raw water were 491; in 1912, with heavier traffic and raw water most of the year, were 676, and in 1913, with circumstances as stated above, the total renewals were only 183.

While the old scale was coming out of the boilers there was considerable foaming, but this gradually disappeared, and with freedom from leaks boiler operation became something of an exact science. The effect on the locomotives was such that since then the addition of treating plants has been continuous, until now there are 77 in use, protecting 1,156 miles of traffic through the wheat fields and the cattle country. They are attached to every water station except one from Devils Lake, N. D., west to Shelby, Mont., a distance of 652 miles; they run in the same manner from Shelby southeast to Comanche, near Billings, Mont., a distance of 295 miles; they protect two important branches of 209 miles, and there are 3 other plants where the division equipment is not yet complete.

The general benefits accruing to the railroad are the usual saving in coal and in boiler repairs, and the saving of time on the road, and the greatest of these is the saving of time on the road. It is not merely that boilers do not leak and fail; it is that the service is dependable, and that every officer can reckon on speeding up his department accordingly.

The following note, under date of January 20, 1919, from the general master mechanic of the Central district concerning the work on the Billings line, represents fairly the conditions and results along the road. "The treating plants were put into operation between Great Falls and Billings during October, November and December, 1917, and we were able to have passenger power use treated water as early as October. In December, 1916, we had 6 complete failures on the Billings district on account of flues leaking. In December, 1917, we had one partial failure, and since that date we have not had an engine failure on account of flues leaking nor have we heard of flues leaking between Great Falls and Billings.

"We used to bombard crown sheets on this district once a month to remove scale that adhered around crown bolts and stays. The stationary boilers at Judith Gap had to be washed once a week and crown sheets scraped in order to keep scale off sheets. The boilers now go 30 days and there is no scale.

"Before treated water was used our helper engines at Armington could not stay in service over 5 days on account of flues leaking, and the Neihart engine which laid over at Armington had to come in once a week. But since

Armington water has been treated the engines stay 30 days, at which time they are brought in for monthly inspection and washout.

"Gerber is the best illustration of what water treating has done. Our Sand Coulee engines use this water only, and a set of flues sometimes used to last six months, but never longer. Since Gerber water has been treated the scale has all come off from stays, crown bolts and flues; and with the aid of a little kerosene the flues and sheets in engine 1204 are as clean as the day she came out of the shop. This engine has now been in service on this one district 15 months as against a maximum life of 6 months with untreated water.

"I cannot say that treated water has reduced our boiler washing, because, on account of the concentration of sodium sulphate and the sludge in the mudring, we think it best not only to change water, but to wash every round trip, the same as before."

On the Montana division main line from Williston west to Cut Bank, a distance of 420 miles, treating plants were installed during the autumn of 1914. Improvement in locomotives and in service followed at once, and increase regularly was evident until in February, 1915, a comparison with the month of February, 1914, under practically the same weather conditions, gave the following results:

	1914	1915	
Boiler repair and washing, hours per week...	2,000	1,000	
Boiler failures on the road.....	10	0	
AVERAGE TONS PER TRAIN			
			Increase
	1914	1915	Tons Per cent
Williston to Glasgow (West)	1,180	1,691	511 43½
Williston to Glasgow (East)	1,602	2,152	550 34
Glasgow to Havre (West)	1,192	1,769	577 47½
Glasgow to Havre (East)	1,810	2,297	487 27
Havre to Cut Bank (West)	936	1,241	305 33
Havre to Cut Bank (East)	1,466	2,134	668 45½
Whole main line.....	1,364	1,881	517 38

In February, 1919, operating conditions in Montana were quite different and most of those engines were working on other divisions. One remains, however, to prove not only that the loading exceeded that of February, 1915, but that the time was less.

Our boiler washing on treated water districts averages about half what it used to be. The roundhouse cost of handling an engine is much reduced. If we succeed in doing away with pitting and grooving, boiler repairs will be almost nil.

No one need expect to get perfect boiler service the first year after installing a set of treating plants, because there are many things other than water which will make a locomotive boiler leak. In the old hard water days, if a boiler leaked, it was easiest to blame it on the water and let it go. But in our case we found that, with treated water, boilers would go through a North Dakota or Montana winter without a sign of leak, and then the first warm day in spring there would be an epidemic; and it took a long time to trace this to a tendency of inexperienced firemen to imagine that a sun which was hot on the back raised outside air to the temperature of the firebox.

It will be found, too, that in hilly districts there is a constant tendency on the down grade to permit thin spots in the firebox and consequent local flue chilling, and there are other causes of unequal heating and of resultant flue leaking well known to boiler men. In bad water districts so much has been blamed on the water that these other matters have not received as much attention as they deserved; but with the advent of treated water and the co-operation of everyone connected with the boiler service in making a careful report of every case of leaking, we are gradually running down these causes and endeavoring to eliminate them.

This is a cold country for a short time every winter and water-treating plants must be carefully housed and heated.

The cost of the housing and the heating apparatus is more than the cost of the plant proper, but it is a necessity, for in winter the water is worst and must be most carefully treated; in winter engines require more water than in summer because of the heating and other extra work they do, in winter there are more engines for the same traffic because the trains are shorter, in winter much water is wasted at coach hydrants and other places to keep the pipes and hose from freezing, in winter the men are all under strain and a frozen pipe line or a failure at a treating plant might disarrange traffic very badly.

Not only are our plants costly in construction because of the climate and the service we aim to give, but also our operating expenses are heavy because of the constant patrol and inspection maintained. Improperly treated water is little better than water not treated at all; and the amount of treatment depends not alone on the kind of raw water (which itself may change 20 grains per gallon over night), but on the rate of pumping, which may be affected 10 per cent or more by an obstructed suction, a flaw in the pump packing, some derangement of the pumping engine, a drop in the voltage of an electric current, or other causes; and under our rule "Get there before it happens, not after," the inspector's duty is not only the regular and frequent examination of the character of the treated water, but the examination, as regular and frequent, of all the appliances which affect the operation of, or the rate of water flow to, the plant. For this reason, our wa-

ter inspectors are the trained and promoted pick of our pump repairers.

The sending of a weekly water sample to a chemist a couple of hundred miles away is good enough for record purposes; but how is the chemist to know why the treated water is not correct, or how is he to know that the pump will not be repaired by the time the pumper receives the data for the changed treatment? I have seen many abandoned water-treating plants on railroads and in other places, but never one which had been regularly inspected on the ground. The value of a properly run treating plant for locomotive service is so much greater than the cost of inspection, with interest and depreciation on its cost of construction, and the value of one improperly run is so small that I think there is no question of method. What is worth doing at all is worth doing well. I have never known a case of locomotive priming with properly treated water which I did not consider traceable to the accumulation of sludge from the last 3 grains per gallon of calcium carbonate which cannot be taken out while the water is cold, and I am confidently looking forward to the time when all boilers will have blow-offs in the front and back ends as well as in the throat sheet, *all operated from the cab*, or similarly operated blow-offs connected to properly perforated pipes inside the boiler bottom and the mud ring. Then 5 seconds' blowing would do more good than 60 seconds' blowing under present conditions, and there would be almost no necessity for boiler washing.

Railway Developments in Foreign Countries

New Corporation Organized in America to Finance Public and Private Enterprises in Foreign Countries

AN IMPORTANT DEVELOPMENT in export trade is contained in the announcement Monday of the incorporation under the laws of Delaware of the Foreign Bond & Share Corporation. The purpose of the corporation, according to the statement issued by the Guaranty Trust Company of New York, is to finance public and private enterprises in Central and South America, the Far East, Europe, and other parts of the world. It will also sell to American investors either the debentures of the corporation, which will be covered by the deposit of the securities of these foreign companies, or the foreign securities themselves. It is the intention of this corporation to reach all investors in the United States.

The Foreign Bond & Share Corporation has an authorized capital stock consisting of 100,000 shares of common stock, of the par value of \$100 each, and 3,000 shares, with no par value, known as "participating certificates," and a subscribed capital and surplus of \$3,000,000.

It is understood, the statement says, that the state department is particularly interested in the development of trade in the manner proposed by the Foreign Bond & Share Corporation.

The organizers of this corporation include private banking firms and some of the strongest financial institutions throughout the United States. Among them are Brown Brothers & Co., J. & W. Seligman & Co., Guaranty Trust Company, Chase Securities Corporation, Central Union Trust Company, Columbia Trust Company, Hayden, Stone & Co.—all of New York; First National Corporation of Boston; Hibernia Bank and Trust Company, New Orleans; First Trust & Savings Company, Cleveland; Anglo & London Paris National Bank, San Francisco; Mercantile Trust Company, Mississippi Valley Trust Company, and interests as-

sociated with National Bank of Commerce—all of St. Louis; and the Central Trust Company of Chicago. Other institutions which have expressed their desire to take part in the enterprise will be announced later.

The directors of the corporation are:

John Henry Hammond and Thatcher M. Brown, Brown Brothers & Co.; Frederick Strauss and William P. Philips, J. & W. Seligman & Co.; Albert Breton and Harold Stanley, Guaranty Trust Company of New York; E. V. R. Thayer and R. I. Barr, Chase Securities Corporation; James N. Wallace, Central Union Trust Company of New York; Howard Bayne, Columbia Trust Company; Charles Hayden, Hayden, Stone & Company; John Sherwin, First Trust & Savings Company; R. S. Hecht, Hibernia Bank & Trust Company; Herbert Fleishhacker, Anglo & London Paris National Bank; Adolfo Stahl of New York and Guatemala; J. Hugh Powers, Mercantile Trust Company; Breckinridge Jones, Mississippi Valley Trust Company; J. G. Lonsdale, National Bank of Commerce; Joseph E. Otis, Central Trust Company of Illinois; and Ernest Gregory, First National Corporation of Boston, and Maurice Hely Hutchinson.

A number of the subscribers of the Foreign Bond & Share Corporation are now actively identified with the Asia Banking Corporation, Mercantile Bank of the Americas, the American Foreign Banking Corporation, Banco Mercantile Americano del Cuba, the China & Japan Trading Company, and other American financial institutions which have branches in many parts of the world. The statement brings out the necessity of investment abroad for foreign trade.

"Latin-American, Asiatic, and other countries undeveloped economically, will buy merchandise from the nation which places capital at their disposal, it says. This has been the

history of undeveloped countries. It is in large the secret of the success of the British, German, and French trade in such countries in the past.

"As regards the European countries, they now owe the United States such enormous sums that the mere problem of exchange necessitates the taking of foreign securities by the American public in payment for our exports of merchandise to Europe, if such exports are to continue in anything like their present volume.

"In the past London has been the great international market for the securities of every government of the earth and of the industries that were among the principal sources of national wealth. British investors always have been large buyers of such securities. The new-found financial position of the United States should result in a similar appreciation on the part of American investors of this factor, which is vital to the future of our foreign commerce.

"Rates of investment return in Latin-American, Asiatic, and other countries needing development are higher than in the United States. There is no reason why, under careful supervision, the American investor should not be given the benefit of such attractive rates of investment return, and at the same time have the protection of good security.

"England, France, and Germany in the past have done most of the financing necessary for the development of foreign countries, and have reaped the benefits; but, as they are no longer in a position to supply the amount of capital needed for this purpose, Americans must furnish the larger part of it from now on."

Chilean Railways to Buy Equipment

Felix Nieto Del Rio, of the staff of the *Diario Ilustrado*, Santiago, in an article written for *The Sun* (New York), is authority for the statement that Chile hopes to borrow \$32,000,000, most of which will be spent during the next three years for railway equipment.

Industrial progress, together with agricultural development due to expanses of land recently irrigated, and the more extensive cultivation of the soil brought about by the increase of population and higher prices of the products, has threatened, he says, to make the Chilean railway system, of which the greater part belongs to the State, incapable of meeting the demand on it, and in this way is jeopardizing the coming prosperity if its deficiencies are not corrected in time.

The remainder of his article follows:

"The total number of ton kilometers transported through the South Central Lines of the Chilean State Railways was: Seventy-nine per cent greater in 1909 than in 1901, 87 per cent greater in 1910 than in 1902, 99 per cent greater in 1911 than in 1903, 105 per cent greater in 1912 than in 1904, and 106 per cent greater in 1913 than in 1905.

"A similar proportion in the increase of passenger traffic was found, the percentages above being replaced respectively by these figures 93 per cent, 92 per cent, 87 per cent, 107 per cent.

"The Chilean Government, due to the actual economic conditions of the country, expects that in the coming years the railway traffic will continue to increase in the same proportion, and has decided to place in the foreign markets the loan that it had been agreed upon to place in the year 1914, but which had been postponed on account of the war, increasing it to \$32,000,000. With this resolution the government initiated the policy that determined the law authorizing the loan, that is: To provide the Chilean State railways with the sufficient and adequate equipment necessary to maintain a correct and efficient service, and in the future increase this equipment systematically following the requirements of the production and commerce of the country.

"These investments, required periodically by the increase

of traffic, correspond really to an increase in capital. It is expected that these periodical loans, to be made after the \$32,000,000 loan, will amount to an average of \$3,000,000 yearly. The \$32,000,000 will be invested systematically between 1919 and 1925 and the greater amount of this sum will be disposed of during 1920, 1921 and 1922.

"The materials to be bought comply in general with the specifications in use in this country, and as it is of interest to the manufacturers here I insert a rough outline of the different items: Electric lines, feeders and sub-stations, \$2,300,000; electric locomotives, \$2,100,000, which materials will be used in the electrification of the railway between Valparaiso and Santiago; rolling stock, \$5,200,000; railroad shops, \$3,100,000; couplers and air brakes, \$1,640,000; electric signal system, \$1,500,000; reconstruction and reenforcing of bridges, \$1,200,000; sidings and double tracking, \$2,820,000; coal storages, \$800,000; ballast cars, \$364,000; buildings, warehouses, machine shops and platforms, \$3,600,000.

"Up to date about ten millions have been spent in purchasing equipment belonging to the different items above listed, nearly all of which has been bought in this country.

"It is natural to expect that the country where the loan is placed will get preference in the sale of materials when the offers are as advantageous as those from other sources. This makes the placing of the loan more interesting for American investors, as they will not only obtain the benefit of the interest, but also the benefits that indirectly come to them or their associates in the different branches of the industries when orders are placed."

Uruguay East Coast Railway

Latest advices are to the effect that the Senate of Uruguay has passed a bill without amendment authorizing the purchase by the state of the Uruguay East Coast Railway and the construction of a branch line from La Paloma to Rocha. The government was urged to proceed with the construction of the latter without delay, although it was estimated that it would cost \$40,000 per kilometre at the present time.

Germans Ousted From Chinese Railroad Loans

The Chinese Cabinet, says an Associated Press despatch, has agreed to a request by the British, American and French governments that German capital be dissociated from the four-Power railway loan agreement concluded by the Chinese government in 1911, under which each financial group contracted for the construction of assigned sections of the Hankow-Szechuan line. In deference to the wishes of the allied powers the German interests will not be assigned to any other nationality but will be divided among the Americans, British and French.

Special Correspondence from China

PEKING, March 5.

During the closing days of December, the managing director of the Peking Suiyuan line negotiated a loan with Japanese capitalists in the amount of Yen 4,000,000 (\$2,000,000), with the line as security. A further provision gives the same capitalists preference whenever foreign money is to be used for extensions to the line. The American firm of Siems-Carey under its opinion on the construction of 1,600 miles of line in China, has marked out a route branching from the further extremity of this line, but which was given up temporarily under a protest from Russian firm of Siems-Carey under its opinion on the construction of aneese loan by two years, it is not anticipated that the American firm will raise any opposition. American firms never have successfully resisted pressure from other nations in China. But the loan is particularly interesting as an indi-

cation of the difficulties of the Chinese government as to funds. This line has been operated at a profit from the very first. It has no funded debt. The purpose of the loan has not been given out. So the inference is that the funds will be loaned to the government for administrative purposes. Up to the present the Chinese have been proud of the fact that the Peking Suiyuan line was "all Chinese,"—built by Chinese engineers and with Chinese money, operated entirely by Chinese forces. That they should now mortgage it to Japanese is very significant.

Exports of Locomotives in February

The exports of locomotives in February totaled 85 with a value of \$2,584,269, as compared with 87 in January, valued at \$3,076,543. The figures compiled by the Division of Statistics of the Bureau of Foreign and Domestic Commerce show that nearly one-half the locomotives exported in February from the standpoint of value were shipped to France. The larger part of the remainder were divided among Italy, Cuba and Egypt.

The figures in detail follow:

Countries	Number	Dollars
France	33	1,126,380
Italy	21	962,650
Spain	2	25,800
England	1	1,250
Canada	1	15,000
Mexico	2	21,400
Trinidad and Tobago	1	9,800
Cuba	12	223,423
Chile	2	14,670
Peru	1	11,000
Japan	4	31,350
Philippine Islands	3	24,325
Egypt	2	117,221
Total	85	2,584,269

Exports of Car Wheels and Axles

The exports of car wheels and axles in February, totaling \$541,630, were double those of January when exports of these commodities were made, valued at \$278,393. The figures as compiled by the Division of Statistics of the Bureau of Foreign and Domestic Commerce, show that nearly one-half the February total was consigned to "Japanese China," and about one-fifth to Canada.

The figures in detail follow:

Countries	Dollars
Denmark	16,700
Italy	33,465
England	18,985
Canada	111,589
Panama	307
Mexico	12,979
Cuba	7,952
Dominican Republic	1,281
Argentina	33,309
Brazil	25,354
Peru	4,647
Venezuela	129
Japanese China	238,945
Straits Settlements	5,500
Japan	22,839
Australia	7,128
New Zealand	67
British South Africa	454
Total	541,630

Exports of Railway Track Material

Exports of railway track material in February showed a considerable increase over January, according to the figures compiled by the Division of Statistics of the Bureau of Foreign and Domestic Commerce.

Exports of rails totaled 66,900 tons with a value of \$6,023,982, as compared with 65,024 tons valued at \$4,221,563 in January. Spikes exported in February reached a value of \$258,073, as compared with \$189,408 in January, while switches, frogs, etc., exported amounted to \$905,264 as against \$543,330 in January. Over half the total of all three were consigned to France. The figures in detail were as follows:

Countries	Railroad spikes		Rails of steel		Switches, frogs, etc. Dollars
	Pounds	Dollars	Tons	Dollars	
Belgium			422	24,260	8,094
France	2,252,960	165,222	49,400	4,847,312	467,701
Italy			3,476	298,135	88,402
Netherlands			383	18,307	695
Norway	1,567	532			
England					1,089
British Honduras	3,000	164			29
Canada	689,500	20,254	2,605	104,281	21,606
Costa Rica					135
Guatemala	2,000	124			
Honduras	17,200	1,360	76	4,643	717
Nicaragua	9,000	639			79
Panama	7,245	503			147
Mexico	41,885	2,023	76	5,867	9,845
Barbados			68	7,000	
Jamaica	8,000	424	59	3,095	
Trinidad			9	689	54
Other Br. West Indies					52
Cuba	681,126	38,704	2,952	184,189	70,938
French West Indies	800	51			400
Dominican Republic	2,000	115	77	4,227	18,233
Bolivia					9,000
Brazil	230,740	14,232			113,278
Chile	23,000	1,853	4	445	4,021
Colombia	28,000	1,966	233	14,710	
British Guiana	4,050	280	51	3,712	239
Peru	42,111	2,986	571	41,893	46,198
Uruguay					1,075
Venezuela	3,000	158			
China			1,447	79,051	65
Japanese China			223	14,329	
Straits Settlements	13,440	835			
Dutch East Indies			351	36,751	14,926
French East Indies					3,825
Japan	123,734	5,132	3,474	268,102	18,577
Siam	7,600	240			
Australia	470	37			
Philippine Islands	13,800	539	826	56,209	5,520
British South Africa			117	6,775	324
Total	4,206,228	258,073	66,900	6,023,982	905,264

Exports of Cars in February

The Division of Statistics of the Bureau of Foreign and Domestic Commerce has added to its detailed compilations of exports of railway material which it began for January a similar compilation for exports of freight and passenger cars. The exports for February were in detail as follows:

Countries	Passenger		Freight and other	
	Number	Dollars	Number	Dollars
France	219	40,708	50	112,600
Canada			6	12,000
Mexico			47	110,180
Cuba	6	90,060	379	513,041
Haiti			55	27,105
Bolivia			12	23,100
Chile			1	1,225
Ecuador			1	110
Dutch East Indies			2	5,200
Russia in Asia			30	152,567
Total	225	130,768	583	957,128

Americans Are Speeding Up Trans-Siberian Railway

Some improvement is noticeable in the operation of the Trans-Siberian Railway since the Inter-Allied Railway Mission began its work, representatives of the mission say, although the mission has done nothing beyond making a preliminary investigation, says a Canadian press despatch. The reason for the improvement is believed to be due to the fact that Allied officers have been visiting the various stations and joggling up the local officials.

The Trans-Baikal line is hampered seriously by the opera-

tions of General Semenoff, whose armored trains demand much needed rolling stock and whose levies on railway funds tend to disorganization.

Rumors of Bolshevik uprisings have caused the officials to use the greatest vigilance in operating the trains.

A Three-Minute Railway Strike in France on May 1

Press despatches from Paris report that the role to be played by the railroad men in the May 1 demonstration has been decided by the General Federation of Labor to consist in the main feature of a three-minute stoppage of trains at or about 10 o'clock in the morning. The stoppage is to be entered in the train logs as "The manifestation of May 1, by order of the Federation." The central office and workshop staffs will lay off for 24 hours, while the depot staffs will stop work for periods of from 15 minutes to three hours, according to the nature of their service.

The union's instructions explicitly state that the stoppages must not in any way endanger the public, special gangs being assigned to make any urgent repairs necessary to the tracks, etc., and the union expressly disclaims all responsibility for individual acts done outside of its instructions.

This decision followed a meeting on April 15 at which the delegates of the unions of the railroad workers, miners, dock workers, metal workers, sailors and general transport workers decided to unite in efforts to obtain recognition of the demands of the workers, especially an eight-hour day and increased wages.

Delegates recognized that the demands of individual unions had been satisfied in many cases, but decided that the members of the unions should not work on May Day, in order to show the power of the organized working classes and the spirit of solidarity. They adopted a resolution, giving the results of the negotiations in detail. The first part, dealing with the railroad union said that definite engagements had been made regarding the eight-hour day and the scale of wages, and that two commissions are in session arranging details.

London Business Interests Oppose British Transport Bill

Representatives of a number of business associations meeting in London recently brought out strong arguments against the proposed Ministry of Ways and Communications Bill and passed resolutions strongly opposing particularly the inclusion of the control over public docks and piers and any alteration in the existing control and management of the Port of London. It was declared that the work of the Port of London authority was complex and efficient and that it was better to let well enough alone.

The bill was perilously overweighted, the meeting declared, and there were other grave objections, the most striking of which was that arbitrary powers were conferred on the minister to override the statutory rights of the undertakings which he was to control. Another objection, greatly affecting London, was the inclusion of the docks in the general scheme. Before that was done some good argument for their inclusion should be brought forward.

The ground the minister took was that the docks were essential to the scheme because they were the great terminal points of the railways. That was not a correct expression so far as London was concerned, it was brought out, for 90 per cent of the produce imported into London docks did not pass on to the railway lines direct from the ship. Besides, vast quantities of goods came into London that never passed at all on to the railway lines, but were reshipped to the near continental or coastwise ports.

Foreign Railway Notes

On February 20, by ministerial order, the managing director of the Peking-Suiyuan railway was created director of aerial navigation. Subsequent reports state that ten Handley-Page machines have been purchased through the Peking Syndicate for use between Kalgan and Urga. These machines are said to be capable of carrying 20 passengers or three tons of freight, and will make the complete trip in ten hours. At present by caravan the trip requires 30 days and by automobile from three to five days. During winter,—six months of the year—the route is closed by snow. An unconfirmed report gives that a loan of \$10,000,000 (Mex.) has been obtained from Japanese sources for the development of aerial navigation.

The Taokow Chinghua line is about to begin work upon a branch line of 37 miles from Chinghuachen to Menghsien. The latter point is on the Yellow river, which offers a means of distributing a considerable portion of the coal business arising some ten miles east of Chinghuachen. Due to the poor navigability of the river during a large portion of the year, it is not anticipated that any large tonnage will be diverted from the usual rail haul to the Peking-Hankow line. The funds are being supplied by the Peking Syndicate, owner of the mines in question.

The Peking-Suiyuan line is about to begin work upon a short branch line to an iron mine a little north of Kalgan. The principal stockholders in the mine are the managing director of the Peking-Suiyuan railway, the Minister of Communications, the former Minister to Japan, now head of the Japanese Exchange Bank of China, and other high officials in the present government. It is understood that ore will be shipped to the Hangyang Iron Works at Hangyang, about 1,000 miles to the south. The latter is under contract to sell its entire output to Japanese merchants.

On February 22, the Standing Committee of the Unification of Railway Accounts and Statistics finished its labors upon a standard set of forms with rules to govern to be used at all stations for accounting purposes. While ministerial sanction is necessary before the standardized system is in force, it is believed that this will be forthcoming. Six months' preparation will be required upon lines using the daily system of reports. All of the French lines come under this category. The committee will next attempt to standardize store accounts and construction accounts.

The through traffic administration has recently perfected plans for the interchange of rolling stock upon the basis of equivalent tonnage. That is, no obligation will rest with respect to the return of a particular car, but per diem charges will be calculated upon the difference in tonnage borrowed and tonnage lent. Settlements will be made through the Clearing House in the Ministry of Communications.

No subject has given rise to more heated discussion in Peking than the unofficial proposal to consolidate the foreign interests in Chinese railways. British and American policy is decidedly pro, Japanese influence is con, while French interests seem to have adopted a waiting attitude. Chinese opinion is distinctly divided. The Minister of Communications is opposed. Outside of his following, official and unofficial opinion is favorable.

Disastrous Collision in France

By a collision between a passenger train and a standing train at Crisse, near LeMans, France, on the 17th of April, 16 American and 17 French soldiers were killed and 45 persons were injured.

Doings of the United States Railroad Administration

Tie Producers Urge Restoration of Competitive Buying—Number of Employees and Pay on Class I Roads

THE RAILROAD ADMINISTRATION has executed compensation contracts with the Port Camden Ferry Company, providing for an annual payment of \$401,556, and the Baltimore, Chesapeake & Atlantic providing for an annual payment of \$86,647.

Locomotives Returned to Home Roads

Practically all of the locomotives that have been used during the past year on railroads other than those of their owners, in accordance with the Railroad Administration's plan of pooling facilities, have now been returned to their home roads or are in repair shops on their way home. Instructions were issued about March 1 that when leased locomotives could be returned to their owning roads without inconvenience and without serious interruption to traffic it should be done as a large number of the roads at that time had locomotives of their own in storage. Nearly 800 locomotives at that time were being operated under lease by roads other than their owners. They have been repaired and put in good shape before return at the shops where the work could be most conveniently done. In many cases, particularly where locomotives were returned from eastern or southern roads to the western lines, it was necessary to use very roundabout routes because of insufficient clearance.

Tie Producers Ask Restoration of Competitive Buying

President John W. Fristoe and a committee representing the National Association of Tie Producers called on officers of the Division of Purchases at Washington last week to urge changes in the methods of the Railroad Administration in the purchase of cross ties for the purpose of restoring competitive buying by the railroads. The committee presented a statement regarding conditions affecting the production and purchase of ties, together with a series of specific suggestions, which were taken under advisement for a definite reply when the director of purchases, Henry B. Spencer, returns from a western trip, but no encouragement was held out to the tie producers to think that the present plan, by which each railroad acts as the agent for the other railroads in the purchase of ties, would be done away with. They were urged to produce as many ties as possible with the assurance that there would be a market for all that meet the specifications.

The statement presented by the committee expressed appreciation and endorsement of the principle of standard specifications for cross ties as a step toward permanent improvement, but objection was made to the plan of fixed prices and limitations of markets. The specific suggestions were that roads on which ties are produced should continue to purchase at present prices such ties as are offered up to November 1; that any railroad may immediately enter into contracts with individual tie producers at prices not to exceed those now in effect at point of shipment up to November 1, provided the quantities and kinds of ties contracted for are approved by the Railroad Administration; that all cross ties should be inspected by regional inspectors at the point of shipment and that the purchase of cross ties for delivery after November 1 should be made in accordance with the following plan:

1. The railroad should register their annual cross tie requirements with the Division of Purchases and all ties

WASHINGTON, D. C.

should be purchased in accordance with national standard specifications.

2. All ties should be inspected by regional inspectors in accordance with standard rules for application of the specifications.

3. Individual roads should enter into contracts for their tie requirements direct with responsible tie producers, filing copies of the contracts with the Railroad Administration.

4. All contracts should be awarded only after fair and open competition has developed the lowest price per tie obtainable from responsible tie producers.

The statement also included other detailed suggestions.

Number and Compensation of Employees

The January, 1919, pay roll of the Class I railroads under federal control was \$230,800,589 for 1,848,774 employees, as compared with \$153,039,988 for 1,703,748 employees in December, 1917, according to a statement compiled by the Operating Statistics Section, which shows the effect of the wage increases during 1918 as between the different classes of railway employees, together with the numbers, the days and hours worked, the compensation per day and per hour, and the percentage of change in the unit compensation for each of the 68 classes prescribed by the Interstate Commerce Commission. The average increase in unit compensation was 48 per cent, the range being from a 20 per cent reduction for general officers receiving \$3,000 per annum and upwards, up to 98 per cent for structural iron workers and 99 per cent for "other yard employees."

The increase in the number of employees was 145,026 or 8.5 per cent and the average compensation per employee in January was about \$125, as compared with about \$90 in December, 1917. This would amount to an average of \$1,500 per year, as compared with an average for the year 1917 of \$1,004.

The increase in the number of employees was the greatest in the territory where the war traffic had been concentrated, notably in the Allegheny region, where the increase was 15.4 per cent. The number and percentage of increase in the total employees by regions and districts is as follows:

	January, 1919.	December, 1917.	Per cent Increase.
New England District.....	89,822	87,324	2.8
Central District	286,334	282,179	1.4
Ohio-Indiana District	50,634	49,373	2.5
Eastern Region	426,790	418,876	1.9
Allegheny Region	403,975	350,014	15.4
Pocahontas Region	58,028	51,390	12.9
Southern Region	257,314	229,320	12.2
Northwestern Region.....	240,110	217,307	10.5
Central Western Region.....	300,833	285,226	5.4
Southwestern Region.....	161,724	151,615	6.7

The number of days worked in January for those employees whose time is reported by days was 6,156,896, as compared with 5,819,461 in December, 1917, and the number of hours worked, for those reported on an hourly basis, was 391,444,564 as compared with 387,696,988. The 1,644,000 employees paid by the hour worked an average of 238 hours in January, 1919, whereas 1,507,000 in December, 1917, worked an average of 257 hours. The average daily compensation for those reported by the day increased from \$3.52 to \$4.83, and the average per hour from \$.342 to \$.514. The weighted average for the increase is 48 per cent.

The average daily compensation of general officers receiving over \$3,000 per annum shows a decrease of 20 per cent,

EMPLOYEES AND THEIR COMPENSATION

MONTH OF JANUARY, 1919, COMPARED WITH MONTH OF DECEMBER, 1917—CLASS I ROADS UNDER FEDERAL CONTROL

Class of employee	Number of employees		Days worked		Hours worked	
	Jan., 1919	Dec., 1917	Jan., 1919	Dec., 1917	Jan., 1919	Dec., 1917
1 General officers, \$3,000 p. a. and upwards.	4,370	4,251	127,747	119,215	.....	.....
2 General officers, below \$3,000 per annum.	2,481	3,201	65,669	88,841	.....	.....
3 Division officers, \$3,000 p. a. and upwards.	3,712	1,717	111,278	42,182	.....	.....
4 Division officers, below \$3,000 per annum.	8,762	9,419	251,705	298,164	.....	.....
5 Clerks, \$900 p. a. and upwards (except No. 37).	205,885	108,185	.....	.....	47,108,809	24,088,379
6 Clerks, below \$900 per annum (except No. 37).	8,903	86,912	.....	.....	1,515,966	20,716,997
7 Messengers and attendants.	9,822	8,810	281,871	242,015	.....	.....
8 Assistant engineers and draftsmen.	10,694	10,810	289,067	288,585	.....	.....
9 M. W. & S. foremen (excluding Nos. 10 and 28).	7,769	7,786	237,528	226,174	.....	.....
10 Section foremen.	39,702	39,443	1,178,324	1,138,383	.....	.....
11 General foremen—M. E. department.	1,745	1,665	53,019	45,168	.....	.....
12 Gang and other foremen—M. E. department.	21,399	18,429	648,421	532,500	.....	.....
13 Machinists.	54,382	42,973	.....	.....	12,592,995	10,651,011
14 Boiler makers.	16,960	13,469	.....	.....	4,078,782	3,411,669
15 Blacksmiths.	9,925	8,369	.....	.....	2,074,276	1,878,208
16 Masons and bricklayers.	1,350	1,330	.....	.....	269,289	297,177
17 Structural ironworkers.	566	852	.....	.....	153,649	192,511
18 Carpenters.	56,057	50,848	.....	.....	12,131,975	11,883,446
19 Painters and upholsterers.	11,064	9,878	.....	.....	2,274,912	2,223,531
20 Electricians.	12,061	9,894	352,501	287,368	.....	.....
21 Air-brake men.	7,328	5,846	.....	.....	1,587,555	1,636,340
22 Car inspectors.	24,902	20,763	.....	.....	6,336,603	6,811,054
23 Car repairers.	81,799	66,443	.....	.....	18,236,118	15,948,946
24 Other skilled laborers.	57,674	55,201	.....	.....	13,205,187	14,030,197
25 Mechanics' helpers and apprentices.	110,870	92,018	.....	.....	24,801,164	23,097,913
26 Section men.	249,015	212,663	.....	.....	59,495,365	53,320,778
27 Other unskilled laborers.	122,881	104,050	.....	.....	29,444,243	27,026,316
28 Foremen of construction gangs and work trains.	2,162	2,239	.....	.....	518,930	707,328
29 Other men in construction gangs and work trains.	30,099	28,651	.....	.....	6,697,610	7,119,116
30 Traveling agents and solicitors.	1,252	5,245	33,262	149,383	.....	.....
31 Employees in outside agencies.	981	1,342	34,133	43,579	.....	.....
32 Other traffic employees.	379	510	10,200	12,623	.....	.....
33 Train dispatchers and directors.	5,399	5,158	.....	.....	1,327,900	1,328,309
34 Telegraphers, telephoners and block operators.	21,914	20,975	.....	.....	5,222,225	5,136,759
35 Telegraphers and telephoners operating interlockers.	7,915	7,588	.....	.....	1,893,374	1,910,410
36 Levermen (non-telegraphers).	3,972	3,513	.....	.....	969,160	993,865
37 Telegrapher-clerks.	11,412	11,178	.....	.....	2,820,176	3,052,479
38 Agent-telegraphers.	18,782	19,149	.....	.....	5,158,275	5,848,196
39 Station agents (non-telegraphers).	14,035	14,411	441,531	452,606	.....	.....
40 Station masters and assistants.	669	614	19,518	19,520	.....	.....
41 Station service employees (except Nos. 5, 6, 37, 38, 39, 40 and 66).	101,626	110,647	.....	.....	24,834,419	30,206,592
42 Yardmasters.	4,031	3,835	126,571	124,312	.....	.....
43 Yardmasters' assistants (not yard clerks).	3,571	3,080	109,475	93,484	.....	.....
44 Yard engineers and motormen.	19,800	20,355	.....	.....	4,867,441	5,593,160
45 Yard firemen and helpers.	20,694	20,821	.....	.....	4,889,536	5,639,441
46 Yard conductors (or foremen).	19,870	20,362	.....	.....	4,800,808	5,472,878
47 Yard brakemen (switchmen or helpers).	51,417	50,874	.....	.....	11,749,143	13,139,861
48 Yard switch tenders.	5,572	4,841	.....	.....	1,535,967	1,534,079
49 Other yard employees.	4,610	3,663	.....	.....	1,252,221	1,180,765
50 Hostlers.	9,908	8,493	.....	.....	2,972,926	2,859,587
51 Enginehouse-men.	71,066	60,439	.....	.....	21,425,629	19,191,693
52 Road freight engineers and motormen.	31,974	32,923	.....	.....	7,749,304	8,849,605
53 Road freight firemen and helpers.	34,409	35,549	.....	.....	7,823,401	8,896,511
54 Road freight conductors.	23,335	26,320	.....	.....	6,580,869	7,556,378
55 Road freight brakemen and flagmen.	62,858	65,242	.....	.....	15,738,811	18,029,699
56 Road passenger engineers and motormen.	11,810	12,326	.....	.....	2,724,306	2,877,377
57 Road passenger firemen and helpers.	11,622	12,433	.....	.....	2,636,626	2,778,482
58 Road passenger conductors.	10,026	10,607	.....	.....	2,337,848	2,460,948
59 Road passenger baggagemen.	5,258	5,532	.....	.....	1,254,982	1,352,449
60 Road passenger brakemen and flagmen.	13,881	14,362	.....	.....	3,200,223	3,356,350
61 Other road train employees.	3,627	3,697	.....	.....	881,618	892,522
62 Crossing flagmen and gatemen.	20,775	15,569	663,069	474,942	.....	.....
63 Drawbridge operators.	1,479	1,267	52,121	41,803	.....	.....
64 Floating equipment employees.	7,841	8,243	.....	.....	2,273,867	2,517,476
65 Express service employees.	1	1	.....	.....	81	200
66 Policemen and watchmen.	10,738	12,275	331,808	389,373	.....	.....
67 Other transportation employees.	5,917	5,492	209,510	175,669	.....	.....
68 All other employees.	18,009	18,202	528,568	533,572	.....	.....
69 Totals.	1,848,774	1,763,748	6,156,896	5,819,461	391,444,564	387,696,988

Class of employee	Compensation						Per cent change in unit compensation
	Amount		Per day		Per hour		
	Jan., 1919	Dec., 1917	Jan., 1919	Dec., 1917	Jan., 1919	Dec., 1917	
1 General officers, \$3,000 p. a. and upwards.	\$2,051,254	\$2,395,628	\$16.07	\$20.10	.....	.....	d 20
2 General officers, below \$3,000 per annum.	442,654	512,579	6.74	5.77	.....	.....	17
3 Division officers, \$3,000 p. a. and upwards.	1,217,927	460,500	10.94	10.92	.....	.....	a
4 Division officers, below \$3,000 per annum.	1,785,883	1,524,238	7.10	5.11	.....	.....	39
5 Clerks, \$900 p. a. and upwards (except No. 37).	24,015,479	10,349,137	.....	.....	\$0.510	\$0.430	19
6 Clerks, below \$900 per annum (except No. 37).	469,555	517,968	.....	.....	.310	.250	24
7 Messengers and attendants.	713,101	389,948	2.53	1.61	.....	.....	57
8 Assistant engineers and draftsmen.	1,480,475	1,132,279	5.12	3.92	.....	.....	31
9 M. W. & S. foremen (excluding Nos. 10 and 28).	1,263,985	832,296	5.32	3.68	.....	.....	45
10 Section foremen.	4,668,256	3,084,905	3.96	2.71	.....	.....	46
11 General foremen—M. E. department.	440,679	225,917	8.31	5.00	.....	.....	66
12 Gang and other foremen—M. E. department.	4,388,800	2,253,167	6.77	4.23	.....	.....	60
13 Machinists.	9,047,042	5,419,490	.....	.....	.719	.509	41
14 Boiler makers.	2,509,803	1,719,544	.....	.....	.713	.504	42
15 Blacksmiths.	1,466,427	928,293	.....	.....	.707	.494	43
16 Masons and bricklayers.	168,920	107,576	.....	.....	.627	.362	73
17 Structural ironworkers.	115,684	.73,420	.....	.....	.753	.381	98
18 Carpenters.	7,018,106	4,154,224	.....	.....	.579	.350	65
19 Painters and upholsterers.	1,394,637	848,462	.....	.....	.613	.382	60
20 Electricians.	1,895,101	926,027	5.38	3.22	.....	.....	67
21 Air-brake men.	958,936	588,059	.....	.....	.604	.359	68
22 Car inspectors.	3,783,853	2,201,447	.....	.....	.597	.323	85
23 Car repairers.	10,365,776	5,831,462	.....	.....	.568	.366	55
24 Other skilled laborers.	8,236,628	5,244,247	.....	.....	.624	.374	67
25 Mechanics' helpers and apprentices.	11,670,454	6,825,060	.....	.....	.471	.296	59
26 Section men.	22,116,352	11,372,899	.....	.....	.372	.213	75
27 Other unskilled laborers.	12,165,831	6,635,365	.....	.....	.413	.246	68
28 Foremen of construction gangs and work trains.	279,447	227,718	.....	.....	.539	.322	67
29 Other men in construction gangs and work trains.	2,659,776	1,697,182	6.35	5.42	.....	.....	67
30 Traveling agents and solicitors.	211,717	809,232	.....	.....	.....	.....	17
31 Employees in outside agencies.	156,490	160,659	4.59	3.69	.....	.....	24
32 Other traffic employees.	64,476	63,831	6.32	5.06	.....	.....	25
33 Train dispatchers and directors.	1,214,446	802,874	.....	.....	.915	.604	51

Class of employee	Compensation				Per cent change in unit com- pensation		
	Amount	Per day	Per hour	Jan., 1919	Dec., 1917		
34 Telegraphers, telephoners and block operators.....	2,826,107	1,690,418	.....	.....	.541	.329	64
35 Telegraphers and telephoners operating interlockers.....	1,065,020	648,654	.....	.....	.563	.340	66
36 Levermen (non-telegraphers).....	480,964	260,794	.....	.....	.496	.262	89
37 Telegrapher-clerks.....	1,497,267	896,806	.....	.....	.531	.294	81
38 Agent-telegraphers.....	2,822,118	1,675,863	.....	.....	.547	.285	92
39 Station agents (non-telegraphers).....	1,932,426	1,330,976	4.38	2.94	.....	.....	49
40 Station masters and assistants.....	101,404	66,970	5.20	3.43	.....	.....	52
41 Station service employees (except Nos. 5, 6, 37, 38, 39, 40 and 66).....	10,126,340	7,164,361	.....	.....	.408	.237	72
42 Yardmasters.....	970,050	605,839	7.67	4.87	.....	.....	57
43 Yardmasters' assistants (not yard clerks).....	712,328	418,949	6.51	4.48	.....	.....	45
44 Yard engineers and motormen.....	3,350,637	3,025,069	.....	.....	.688	.541	27
45 Yard firemen and helpers.....	2,369,162	1,918,553	.....	.....	.485	.340	43
46 Yard conductors (or foremen).....	3,054,313	2,640,518	.....	.....	.636	.483	32
47 Yard brakemen (switchmen or helpers).....	7,056,575	5,690,199	.....	.....	.601	.433	39
48 Yard switch tenders.....	532,597	365,213	.....	.....	.347	.238	46
49 Other yard employees.....	468,631	222,327	.....	.....	.374	.188	99
50 Hostlers.....	1,504,564	941,060	.....	.....	.506	.329	54
51 Enginehouse-men.....	9,063,710	4,643,739	.....	.....	.423	.242	75
52 Road freight engineers and motormen.....	6,390,593	6,258,403	.....	.....	.825	.707	17
53 Road freight firemen and helpers.....	4,817,163	4,059,644	.....	.....	.616	.456	35
54 Road freight conductors.....	4,553,106	4,313,747	.....	.....	.692	.570	21
55 Road freight brakemen and flagmen.....	8,543,495	6,949,781	.....	.....	.543	.385	41
56 Road passenger engineers and motormen.....	2,686,215	2,584,447	.....	.....	.987	.898	10
57 Road passenger firemen and helpers.....	1,830,477	1,552,220	.....	.....	.694	.559	24
58 Road passenger conductors.....	1,947,835	1,818,760	.....	.....	.833	.739	13
59 Road passenger baggagemen.....	722,770	569,554	.....	.....	.576	.421	37
60 Road passenger brakemen and flagmen.....	1,855,681	1,421,430	.....	.....	.580	.424	37
61 Other road train employees.....	414,008	276,235	.....	.....	.470	.309	52
62 Crossing flagmen and gatemen.....	1,759,982	751,899	2.65	1.58	.....	.....	68
63 Drawbridge operators.....	158,671	88,618	3.04	2.12	.....	.....	43
64 Floating equipment employees.....	1,046,407	763,084	.....	.....	.460	.303	52
65 Express service employees.....	11	50	.....	.....	.136	.250	d 46
66 Policemen and watchmen.....	1,143,516	962,869	3.45	2.47	.....	.....	40
67 Other transportation employees.....	708,035	427,405	3.38	2.43	.....	.....	39
68 All other employees.....	1,450,461	1,060,961	2.74	1.99	.....	.....	38
69 Totals.....	\$230,800,589	\$153,039,988	\$4.83	\$3.52	\$0.514	\$0.342	48

d—Decrease. a—Less than one-half of one per cent.

but the number of such officers shows an increase from 4,251 to 4,370, while the average for those paid less than \$3,000 has increased 17 per cent, and their number has decreased from 3,201 to 2,481. This shows the effect of the cutting off the operating pay roll or reducing the pay of the higher salaried officers, while the lower paid officers have had their compensation increased. The total number of general officers has been reduced from 7,452, who were paid a total of \$2,908,207, or an average of \$390, in December, 1917, to 6,851, paid \$2,493,908, or an average of \$364, in January, 1919, a saving of 601 in number and of \$414,299 in salaries.

The number of division officers paid \$3,000 a year and over also shows an increase, from 1,717 to 3,712, while the number receiving less than \$3,000 has been decreased from 9,419 to 8,762.

The number of employees for 1919 is as of January 16. The number for 1917 is as of a typical day of the week of December 16. The mileage covered for 1919 is 228,571 and for 1917, 228,914.

The largest increases in the number of employees are shown in the mechanical department. A considerable reduction is shown in the number of train employees, attributable to the decreased volume of traffic.

The details are given in the accompanying table.

Modification of Shipping Day Plan

Director General Hines announces that as a result of conferences with representatives of the National Industrial Traffic League and some of the state railroad commissioners regarding the movement of less than carload freight, decision has been reached as follows:

"Shippers shall not be deprived of the right to route less carload freight over any line at the legal rates applicable or of delivering it at point of origin to such carrier on any week day except holidays during the established hours of service. Preferred routes will be established on the basis of convenience of patrons, economy, despatch and proper destination of railroads not under federal control and less carload freight will be routed accordingly except when routed by shipper at shipping points.

"Where it can mutually be arranged between representatives of the shipping public and the carriers schedules will

be arranged covering forwarding of less carload freight from such points in through cars or set out cars on specified days, it being understood that such cars be forwarded daily except Sunday and holidays, when tonnage is offered in sufficient amount.

"Peddler cars are to be operated on all week days but holidays except when a less frequent service meets the requirements. The foregoing shall not be construed as requiring the establishment of additional train service."

This is in accordance with the report of a committee at the conference, which was published in our issue of April 11.

Certificates of Indebtedness

Up to Thursday the Railroad Administration had issued and delivered certificates of indebtedness to equipment companies on account of amounts due for cars and locomotives to the amount of about \$14,000,000 and about \$2,000,000 certificates had been signed ready for delivery. The total indebtedness to equipment companies is now about \$60,000,000, and certificates will be issued on application which can be used as collateral either at banks or, if necessary, for loans from the War Finance Corporation. They are issued in denominations convenient for payment to specialty and material companies for their bills against equipment companies. The Administration has also begun the issuance of certificates to railroad companies to meet their May 1 requirements, and will issue for that purpose about \$70,000,000.

Steel Controversy Reopened

President Wilson has declined to take sides in the controversy between the Industrial Board of the Department of Commerce and the Railroad Administration regarding steel prices but has sent a cablegram to Secretary Redfield, the effect of which is to direct the reopening of negotiations in another effort to reach common ground. Secretary Redfield had asked the President whether the board should be disbanded or remain quiescent until his return. Chairman Peck of the board immediately wrote to Mr. Hines, who is in the west, suggesting a new conference, and the board began to prepare for further conferences with other industries.

Director General Hines announced that in order to make effective the policy already announced as to publicity in connection with railroad fuel contracts it has been decided to post on all bulletin boards or in a record book open to the public at the headquarters of the purchasing agent of each railroad under government operation the following facts: The name of the coal company or coal operator to whom a contract for railroad coal has been allotted by the railroad in question, the price of the coal contained in the contract, the tonnage involved in the contract, the duration of the contract. Through this method the information will be made available not only to coal miners and coal operators, but, the public generally.

A conference between Mr. Peek and R. S. Lovett and Henry Walters of the Railroad Administration advisory committee on purchases was to have been held on Monday but was postponed because of the illness of Judge Lovett. There have been other cablegrams from the President to Mr. Hines and to Secretary Redfield but they have not been given out. It is reported that the members of the Industrial Board have prepared letters of resignation but that they have been withheld pending new developments.

Disputes Between Employees Organizations

Director General Hines has announced in supplement 22, General Order 27, that he will not become involved in juris-

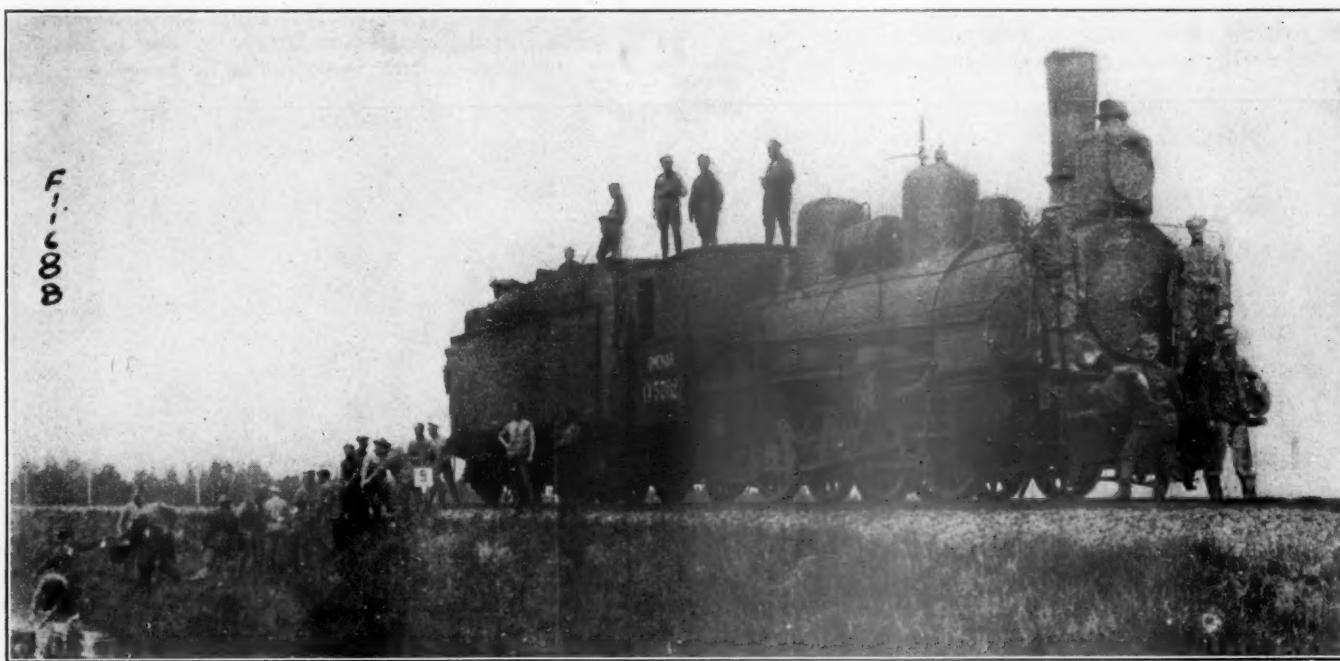
Side Lights on the Russian Railroad Situation

Russia's way of operating railroads is described in an entertaining fashion by Major Benjamin O. Johnson of the American Railway Mission to Russia in a letter to his father, Olaf Johnson of Worcester, Mass. Writing under the date of October 3 about conditions on the Russian railways as he found them Major Johnson says:

"I can not tell you what I am doing at the present time, so will proceed to tell you something of the Russian way of running a railroad. All the State railways of Russia are divided into small lines of about 1,500 miles in length. Each of the small lines has a complete general and supervisory organization; is actually about four times our force in the States. Office forces work from 9 to 3 with some 10 or 15 minutes for tea about noon. The real officers and heads of departments show up about 10 and leave about 2.

"When it is considered that the Russian officer in any line of work is the inventor of thoughtful, systematic, effective and perfected procrastination, and also in the noble art of 'passing the buck,' it is really most surprising that they are only four times as heavily officered as we are in America.

"Along the lines of organization, every railroad officer must be a graduate engineer. The common ruck never has a look-in. You have read stories and seen plays of comic



With the Czechoslovaks in Siberia—Taking Water from a Wayside Brook

ditional disputes between organizations of employees which in some instances have demanded removal of employees because of belief that classification of employees named in wage orders established rights to such demands and have claimed that wage orders have established jurisdiction for certain organizations over all employees of certain classes. No order or supplement has such intent, he says.

Contracts with 70 Roads

The Railroad Administration to April 17 had executed standard compensation contracts with 70 roads; 62 of these were Class 1 roads. There were 68 contracts with a total annual compensation of \$529,000,000, and two contracts with a lump sum of \$121,000.

opera South American armies with 50 generals and 10 soldiers. The Russian way of running a railroad is along the same lines, and the comedy of the situation never appeals to the Russian railway officers. When it comes to morals for this office-holding class there is no such animal. Honesty, ditto, ditto. So much for the officers and their staffs.

"The rank and file of the Russian railway workmen are as fine a bunch of workmen as are found in the world. They are about 75 per cent. as efficient as our men, but are steady, good-natured and very good workmen. Bolshevism is simply the misdirected expression of a class of workmen against the officer class.

"There is no middle class in Russia. Either you are to the purple born or you are a roughneck.

"Please don't understand that the Russian people average to Americans. They have many undesirable qualities, but they are honest. They don't know what they want. They don't know what liberty is, but they want it. They are coming out from their 'liberty jag' and are waking up. My sympathies are certainly with the Russian common people as against their so-called 'intelligentia' class.

"I can give you one very good illustration of the difference. Along Lake Baikal, on the Siberian Railroad, are 41 tunnels. The cut stone and masonry, the brick work and, in fact, all the workmanship is something splendid. The engineering is a joke.

"To start with, the locating engineers could have avoided half these tunnels on the present alignment and, by leaving the lake, could have avoided this tunnel district entirely. In other words, the engineers fell down, but the workman did his share satisfactorily. This runs through all the engineering work I have seen.

"The old Russian governing class still believes in the divinity of the class. I heard a very highly educated Russian, who had been converted to the republican theory, express himself that he believed absolutely in the democratic form of government. Freedom was to be universal, excepting that the workingmen must not be permitted to vote as they had no idea of their own best interests. He was just as serious about this as he could be, and could not be convinced that what he was talking about was not a democratic form of government at all! Yes, the Russian 'intelligentia' is impossible. In any event, every officer so conducts himself that you can never fasten anything on him.

"Physically speaking, the Russian railways are in very

rails and then ran a bunch of equipment into the open gaps at the far foot of the hill. We were only two hours getting a hole through and away we went again.

"Do you know that the movement of these 135 trains was made over the hills without accident of any kind? Of course, we had double track to operate on and opposing business was extremely light. Practically all enginemen handling the Czech trains were from the Ural district and mind you, no air, nothing but water and hand brakes. That is the kind of a workman the Russian workman is.

"I remember well my own sensations at the summit. We had about 40 cars—no air—and I went over to the head end and asked the engineer if he had ever been over here before, and he told me he had never been east of Omsk before. Going down this hill, not knowing what the bunch ahead was doing on the water and hand brakes on every car—to put it mildly, I was quite nervous.

"In reading over the above I note that I omitted the most important part which is that the mountain movement in question was made in 48 hours. It was wonderful."

Chamber of Commerce Report on the Business Situation

A COMPREHENSIVE REPORT on the business situation issued by the Chamber of Commerce of the United States says: "The railroads are in serious condition. This seems chronic, and is due largely to the increase in salaries and wages, which is not offset by heavy increases



A Czechoslovak Armored Train at Chaljabinsk, on the Trans-Siberian

good shape. I venture the opinion today there is not one single American trans-continental line in the splendid physical condition of the trans-Siberian. Of course, the little organization they ever had is entirely gone, but the rank and file, through all the confusion, has gone ahead getting out ties, putting them in, raising joints and keeping the property up.

"During the big drive across Siberia we had considerable fighting at the divide between Lake Baikal and Pacific watersheds. To cross this summit is quite a bunch of 1.75 grade. When we got to the near side of the foot of the hill we were so close to the trail of the Magyars and Bolsheviks that they could not stop to blow up any bridges or fuss up any railroad until they could get a few miles ahead of us. So over this mountain we tore—the enemy ahead in some 75 trains and we behind in some 60. Our head end, which was our train, had to feel our way over. They took out some

in freight and passenger charges. To return the roads to their stockholders in their present condition would mean bankruptcy to the entire system. There must first be a thorough readjustment between expenses and revenues. Meanwhile the roads must naturally experience a decline in their volume of business at least for a time, because of withdrawal of Government transportation created by the war and the present smaller volume of domestic business." The report also comments on the effect on lumber business because the largest single consumers, the railroads, are slow in buying, and railroad buying of iron and steel products is light.

The American Association of Freight Agents will hold its annual meeting at Cleveland, Ohio, on June 17, 18, 19 and 20. E. L. Kemp, Union Stock Yards, Chicago, is president of the association, and R. O. Wells, Chicago, is secretary.

The Canadian Government and the Grand Trunk Pacific

THE EVENTS which immediately preceded the appointment on March 8 of the Honorable J. D. Reid, Minister of Railways, Dominion of Canada, as receiver for the Grand Trunk Pacific Railway Company, because of their unusualness and unexpectedness, constitute an interesting chapter in the development of Canada's railways and their relation to the Dominion government, and throw some light on the present railway situation in Canada. This action, according to governmental announcements, was taken mainly because of the peremptory notice given by A. W. Smithers, chairman of the board of directors of the Grand Trunk Railway Company, that on March 10, one week after the information was given, operations on the entire Grand Trunk Pacific Lines west of Winnipeg would be discontinued.

The financial condition of this road for the past few years has been very serious and the Grand Trunk Railway Company, which originally took \$25,000,000 stock in the Grand Trunk Pacific, is now liable for about \$97,000,000, and the government, owing to the payments of deficits and guarantee of bonds is liable for approximately half of the estimated cost of the road or \$100,000,000. The actual correspondence

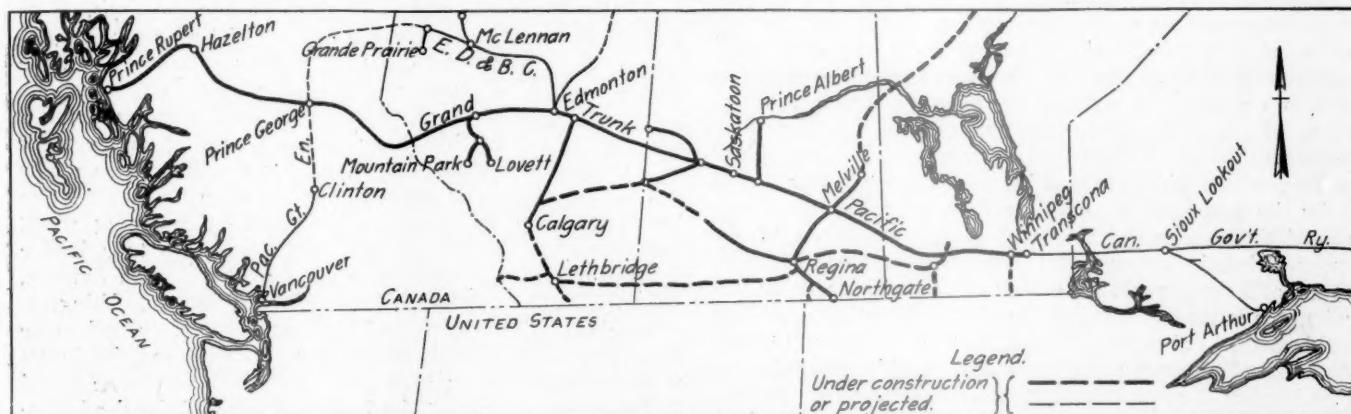
operating obligations.' The small balance of the vote amounting to about \$28,000 will, I understand, be required for the same purpose. There seems no doubt that the deficit in operation should have priority over all other charges.

"I have already informed Mr. Kelley, president of the company, and yourself, that it is not the intention of the government to ask Parliament to provide a further vote for the Grand Trunk Pacific while our negotiations with the Grand Trunk remain in their present unsatisfactory condition. It will be for the Grand Trunk directors to determine the question of their responsibility in respect of the interest maturing tomorrow upon securities guaranteed by their company."

The interest on the Grand Trunk Pacific debenture stock was, however, paid when due.

Following this letter came the sudden announcement by Frank Scott in a letter to Sir Thomas White, dated March 4, that "in view of the fact that the increased rates applicable to the Grand Trunk Pacific have not been sufficient to meet the increased operating expenses, it will not be possible for that company to continue its operations when the present funds have been exhausted, which will be about March 10." The governmental answer to this notice was an order passed in council appointing the Honorable J. D. Reid, receiver for the company.

Negotiations between the Grand Trunk and the government have been carried on for some time with a view to the



Occupation of the Western Canadian Provinces by the Grand Trunk Pacific

and negotiations which led up to the acquisition of the Grand Trunk Pacific by the government grew out of the decision of the Dominion government not to ask Parliament to provide further funds for the Grand Trunk Pacific while negotiations with the Grand Trunk, the parent company, were in an alleged unsatisfactory condition.

Frank Scott, vice-president and treasurer of the Grand Trunk Pacific on February 25, wrote Sir Thomas White, finance minister, and acting prime minister, in part, as follows:

"I am in receipt of a cable from Mr. Smithers stating that in the anticipation of receiving the balance of the appropriation of \$7,500,000, viz., \$951,911, to apply for interest on Grand Trunk Pacific debenture stock due March 1, payment was duly advertised. In consequence, however, of the remittance being coupled with the condition that it is to be used only for operating obligations, the company will be unable to meet the interest due on March 1, and a serious situation will result."

To this letter Sir Thomas White replied as follows:

"With reference to the balance of the appropriation of the vote of \$7,500,000 by parliament, \$923,311 was paid to your company on your certificate No. 10, dated January 28, 1918, approved by the acting Deputy Minister of Railways. This certificate expressly states that this sum is 'on account of cash deficit in the operations of the company from April 1 to November 30, 1918, inclusive,' and 'is required to enable the company to meet its

purchase of the Grand Trunk system by the government. The state of these negotiations is indicated in the following series of telegrams, the first from Mr. Smithers to Sir Thomas White, which reads in part as follows:

"I have received a cable containing an extract from your letter saying that it is not the intention of the government to ask Parliament to provide a further vote for the Grand Trunk Pacific while negotiations with the Grand Trunk remain in their present unsatisfactory condition. I beg to recall that when the ministers came over last summer, it was stated in Parliament that negotiations would be resumed in London. I accordingly saw the ministers with members of the board several times, and at last was told that the ministers could make no advance in their original offer without the consent of the full cabinet in Ottawa. In these circumstances progress in negotiations was impossible, but with a view to facilitating matters, just before the Prime Minister left for Canada, a committee of the board and myself saw him, with two of his colleagues, and made a fresh proposal, involving a very big reduction in our first offer. This offer was not accepted, but on November 5, the High Commissioner for Canada sent for me and said he had a message from the Prime Minister asking me if we wished to continue negotiations, and if so, he thought I should go to Canada. I told the High Commissioner that, looking to the fact that the government had given no sign of any intention of departing from their original offer, I thought it was useless going out unless I had some further explanation or assurance as to the

government's intentions. To this we have had no reply, and I really fail to see how the company can be held responsible for the unsatisfactory condition of our negotiations."

Sir Thomas White answered Mr. Smithers on March 8, as follows:

"The government considers that the unsatisfactory condition of negotiations is due to the Board of Directors of the Grand Trunk Railway Company entirely failing to appreciate its responsibilities to the Grand Trunk Pacific undertaking, and the bearing of its liabilities in respect thereto upon the question of the net earning power and value of the Grand Trunk Railway System. In November last the Prime Minister cabled to Sir George Perley to suggest to you that if your company desired further negotiations the government would be glad to see you in Canada as soon as convenient. He pointed out that it did not seem useful to continue discussion by correspondence. He also suggested that if you came you should be invested with ample powers to conclude an arrangement if one could be reached. Your attitude towards the reasonable suggestion contained in the Prime Minister's communication seemed clearly to indicate indifference towards the continuance of negotiations. Confirmatory of this is the peremptory notification on Thursday last to the government, without previous intimation or discussion, that the Grand Trunk Pacific would on March 10 discontinue operations entirely, regardless of consequences to Canada, through interruption of traffic over a system so extensive and important."

The official announcement of the receivership was made by Sir Thomas White on March 8, and the Minister of Railways commenced to act as receiver on March 10. W. P. Hinton, vice-president and general manager, and other company officials having signified their willingness to obey the order in council were retained in their respective positions and no changes of title have been announced. The Minister of Railways is acting as receiver in his individual capacity, as though appointed by the Exchequer Court, and not by the government. On March 10, Sir Thomas White outlined the case to the House of Commons and on March 20 moved that the House go into committee to consider a resolution that it was expedient to bring in a measure to ratify and confirm the order in council of March 7, appointing a receiver for this road. Following the introduction of this matter into the House of Commons there was considerable discussion as to the legality of applying the war measures act to this case, but the resolution was concurred in. A bill giving effect to the resolution was then introduced by Sir Thomas White, and read a first time.

The Canadian Government Railways, a public service corporation recently formed by the government, consisting of the old Canadian Northern, the National Trans-Continental and the Intercolonial line operated as one system, now comprises 11,540 miles of railway, and with the addition of 2,229 miles of the Grand Trunk Pacific the government will be operating 13,959 miles under one system. If the Grand Trunk system, including the old Grand Trunk and the Grand Trunk Pacific, eventually comes under government control there will be operated under one system a total of 17,511 miles exclusive of a number of smaller lines which would soon be forced by these conditions to come under the same direction. The effect of this possible amalgamation will be probably to place the government system in a position to compete effectively with the Canadian Pacific system, which now has a mileage of 12,823 miles, and is the one big successful private railway corporation in Canada.

A DISAPPOINTED MONOPOLIST.—F. G. Pettibone, federal manager of the Santa Fe and Gulf Coast lines, arrived in Houston Friday morning. He said that he had come to discuss plans for obtaining exclusive control of the transportation business of Houston for his lines and asked if there was any method by which this monopoly could be obtained. It was suggested that W. D. Hines or possibly Albert Sidney Burleson was the man to approach on a monopolistic proposition.

Train Accidents in March¹

THE FOLLOWING is a list of the most notable train accidents that occurred on the railways of the United States in the month of March, 1919:

Date	Road	Place	COLLISIONS		Kind of train	Kil'd	Inj'd
			Kind of accident	train			
†1.	N. Y., N. H. & H.	Touisset, Mass.	bs	P. & F.	2	34	
6.	Pennsylvania	Heaton, Pa.	rc	F. & F.	5	2	
13.	Pitts. & L. Erie	Newcastle	xc	F. & P.	0	4	

DEBAILMENTS							
Date	Road	Place	Cause of derailment	Kind of train	Kil'd	Inj'd	
4.	Atlantic C. L.	Cairo, Ga.	b. rail	F.	0	0	
10.	Waynesburg & W.	Vankirk	unx	P.	0	8	
14.	Seaboard A. L.	Kress, Va.	.....	P.	0	1
18.	Texas Mid.	Atlas	d. track	P.	0	0	
21.	Del. L. & W.	Cresco	boiler	F.	3	0	
27.	St. Louis S. W.	Pine Bluff	b. rail	P	0	0	

The trains in collision at Touisset, Mass., on the first of March were passenger train No. E23, consisting of a single car, and a work car. The passenger car, an electric motor, was crushed for a length of 15 ft. One passenger was killed and 25 passengers and nine employees were injured. The motorman of the work car was killed. The line is worked by the manual block system, and it appears that the passenger train entered the block section under a permissive signal; also that the flagman of the work train failed to flag the passenger train properly.

The trains in collision at Heaton, Pa., on the sixth, about 5:30 a. m., were eastbound freights. The leading train, consisting of a locomotive and 85 cars, was at a standstill, the locomotive taking water; and the other train, consisting of a locomotive and 76 cars ran into it at good speed, making a bad wreck. A westbound freight was passing on the track to the left; and there were standing freight cars on side tracks both north and south of the two main tracks. Flames burst from the wreckage, and, fanned by a strong wind, spread among the cars on all tracks and also to a bridge above the tracks. Fire companies were called from Lamont, Edge Hill, Bryn Athyn, McKinley, Jenkintown, Abington, Glenside, Willow Grove and Hatboro; but water had to be run in hose for about three-quarters of a mile and the flames were not subdued for 17 hours. Five trainmen were killed and one was injured. The bodies of four of the dead were burnt up. The collision occurred on a straight line, in clear weather. This line, the Trenton cutoff, is operated by the manual block system. This collision occurred in a block section six miles long, and the rear of the standing train was 2885 ft. east of the entrance to the block section. The following train was running under a permissive signal and responsibility for the collision is charged against both the engineer of that train and the flagman of the standing train. The flagman had used neither torpedoes nor fusees. The engineer is reported as saying that he was blinded by the glare of the headlight of the westbound train. Estimated loss \$200,000.

The trains involved in the collision on the Pittsburgh & Lake Erie at Newcastle, Pa., on the morning of the 13th, were eastbound passenger No. 506, and a switching engine of the Carnegie Steel Company's plant, which ran uncontrolled from a siding into the side of the passenger train. One combination passenger and baggage car was pushed off the track and into the Shenango River. Six trainmen were slightly injured. Most of the passengers were railroad employees going to their work; a few of these were slightly injured.

¹Abbreviations and marks used in Accident List:

rc, Rear collision—bc, Butting collision—xc, Other collisions—b, Broken—d, Defective—unf, Unforeseen obstruction—unx, Unexplained—derail, Open derailing switch—ms, Misplaced switch—acc. obst., Accidental obstruction—malice, Malicious obstruction of track, etc.—boiler, Explosion of locomotive on road—fire, Cars burned while running—P. or Pass., Passenger train—F. or Ft., Freight train (including empty engines, work trains, etc.)—Asterisk, Wreck wholly or partly destroyed by fire—Dagger, One or more passengers killed.

The train involved in the accident near Cairo, Ga., on the morning of the 4th, was a westbound freight. It was derailed by a broken rail and 19 loaded cars fell through the trestle over Ochlocknee River. The trestle for a length of 400 ft. was destroyed. Trains were detoured for three days.

The train derailed on the Waynesburg & Washington, at Vankirk, Pa., on the 10th, was southbound passenger No. 542. Three cars were overturned; but the train was moving slowly and was quickly stopped. Eight persons were injured. The cause of the derailment was not determined.

The train derailed at Kress, Va., on the 14th, was a southbound passenger. The engine and five cars were derailed and four sleeping cars fell down a bank. One employee was injured.

The train derailed near Atlas, Tex., on the evening of the 18th, was southbound passenger No. 1. Three cars left the rails, but reports indicate that no person was seriously injured. The derailment was due to insecure track on a curve in a cut, resulting from heavy rains.

The train involved in the accident near Cresco, Pa., on the 21st, was a westbound freight, drawn by three locomotives, two ahead and one pushing, moving at low speed up grade. The boiler of the leading locomotive exploded and was wrecked, and the engineman, fireman and one brakeman were killed. The train consisted of 72 cars, and two cars near the rear end were thrown off the track, obstructing the eastbound track. The explosion was due to low water in the boiler of the engine.

The train derailed at Pine Bluff, Ark., on the 27th, about 2 a. m., was southbound passenger No. 3. Two passenger cars were partly overturned, and five passengers were slightly injured. The derailment was due to a broken rail, 75-lb., found to be badly piped.

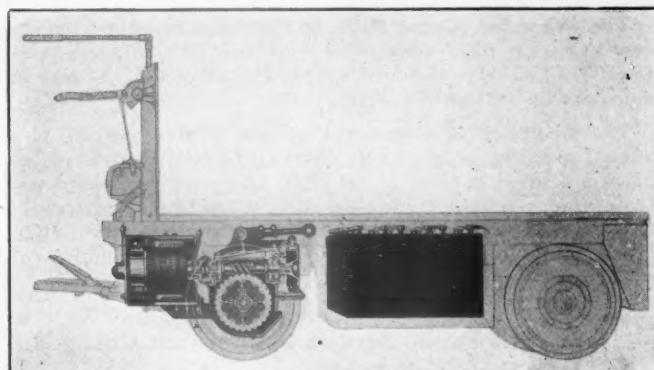
Canada. On the Canadian National Lines at Saskatoon, Sask., on the 24th of March a passenger train was derailed near an elevator, and the locomotive, knocking down a part of the wall of the building, caused the rupture of several grain bins; and the engine and first two cars were buried in an avalanche. The engineman, fireman and one other man were smothered to death.

Industrial Trucks With Standardized Parts

STANDARDIZATION OF PARTS whereby the essential details of various styles of industrial tractors and utility trucks are made interchangeable is a noteworthy feature of the equipment manufactured by the Baker R. & L. Company, Cleveland, Ohio. Some of the salient features of this system, under which 98 per cent of all vital parts are said to be identical, will be found of interest to those concerned with the installation and operation of industrial trucks for handling freight and baggage or supplies at shops and storehouses since the interchanging of parts from one machine to another greatly reduces the necessary supply of spare parts.

An adequate comprehension of the system necessitates a general knowledge of the make-up of these trucks of both the tractor and burden-carrying models. All of the standard trucks are of the four-wheel steering type, that is with all four wheels swiveled by the action of the steering lever, the arrangement being such that all wheels travel on arcs having a common center. Under this arrangement the load is applied from a structural steel platform through a spring pedestal to the top of the knuckle. The standardization idea is carried throughout this detail since the same steering knuckles, jaw parts, wheels and tires are used on the trailing and power axles of both the tractors and utility trucks. The tractors are either two-wheel or four-wheel drive but the trail-

ing axle is substantially the same as the power axle with its differential and driving parts omitted. The application of power and transmission is the same in all types, except that a 48-volt motor is used for the tractor instead of the 24-volt type used for the general utility truck. However, the worm drive, as shown in one of the photographs, with a single reduction direct to the driving axle is standard throughout all of the types. By extending the motor shaft to the other pair of wheels and replacing the trailer shaft by another drive



Phantom View of a Utility Truck Showing Details of the Power Unit

shaft, the truck is readily transformed from two-wheel to four-wheel drive.

The working conditions and purchaser's requirements determine the battery equipment. With a view to having battery trays for tractors and trucks made up of identical units the standard truck battery compartments provide for two trays of 6 lead cells or two trays of 11 to 12 Edison cells. In the case of the high platform utility trucks the battery compartment is underneath the platform between the wheels, whereas in the tractor and the elevating and low platform



A Tractor of the Four-Wheel Drive, Four-Wheel Steer Type

trucks, the battery compartment is on top of the platform.

Standardization of parts is also applied to the auxiliary equipment. The controller, which is of the continuous short-drum type in a cast metal housing, is the same on all the models. This is also true of the automatic switch operated by a foot lever so that the current is on only when the operator has his foot on the lever. This standardization between models has been made possible by the simultaneous development of all the basic units. It contributes materially in shortening the time that the trucks stand in the repair shop.

General News Department

The War Department has announced that the 66th Company, Transportation Corps, had been assigned to early convoy for its return to this country.

The Waterloo, Cedar Falls & Northern reports a 100 per cent Victory loan subscription; 335 employees subscribed \$34,200. This was the first railroad to report a 100 per cent subscription to the new loan.

The Chamber of Commerce of the United States, at its annual meeting, at St. Louis (Statler Hotel), next week, will discuss a great variety of subjects, as heretofore announced. Group four—transportation—will meet on Tuesday afternoon. George A. Post is chairman of this group. Director General Hines and United States Senator Albert B. Cummins will speak on Wednesday evening.

New York Public Service Commission Changed

The New York State Public Service Commission for the first district (New York City), consisting of five members, is to be changed, and, so far as the steam railroads are concerned, will hereafter consist of only one member. This results from a law which was passed by the 1919 legislature, just adjourned, and which, it is understood, is sure to receive the approval of the governor. Another law provides for a separate commissionership, of one member, to supervise the completion of the subway and elevated railroads now in course of construction in the city.

Conference of Technical Societies

A conference of representatives of the technical societies of America was held at Chicago on Wednesday, Thursday and Friday of this week. This conference was called by Engineering Council (a joint organization of the four national engineering societies with the American Society for Testing Materials) to consider the advisability of advocating the creation of a national department of public works. Among the subjects which were considered were (a) what Federal bureaus or activities which should be included in a department of public works—(b) whether an effort should be made to secure an additional Cabinet office, or to make over one of the present departments by the redistribution of activities—(c) whether the present efforts shall be to reorganize the engineering bureaus completely or merely to bring these bureaus under a single head so that such rearrangement of functions as may be found desirable may be made gradually. Among other subjects which were presented for consideration were the creation of a department of transportation and the definition of the attitude of the conference with respect to engineering work on highways, rivers and harbors and railroads.

American Bureau of Welding

At the meeting of this Bureau held on April 11, at the Engineering Societies building, 33 West 39th street, New York, the by-laws of the Bureau were adopted and the following officers were elected: Director, C. A. Adams; vice director, H. M. Hobart; vice-director, A. S. Kinsey; treasurer, W. E. Symons; secretary, H. C. Forbes. Regular meetings of the Bureau are to be held on the third Friday of each month.

The Bureau voted to establish a research committee for the purpose of carrying out the plan of co-operation in conducting investigations in welding, and appointed 52 members. This membership will be increased from time to time.

The American Bureau of Welding was organized for the purpose of providing a means for co-operative research and standardization in welding. The nucleus of the bureau consists of the board of directors of the American Welding

Society, and that the bureau may fulfill its mission, the board invites engineering societies, associations and government departments, each to designate a representative for appointment as co-operating director; and appoints the representative so designated a director of the American Bureau of Welding with full powers.

"Prevent a Claim a Day"

R. H. Aishton, Northwestern regional director, in an effort to minimize freight loss and damage, has started a campaign to "prevent a claim a day." The claim prevention departments of carriers in the Northwestern region, under the supervision of the regional bureau for the prevention of freight loss and damage, have dealt personally with the employees who handle freight, inculcating a feeling of individual responsibility. In a statement outlining this campaign, issued by Mr. Aishton's office, it is said that the claim payments of the past year amount to about 3 per cent of the freight earnings, which is a large increase. This increase is due in a large measure to inexperienced help, to the increased price of commodities (with the smallness of the increase in transportation rates) and to the inferiority of containers.

Railroad Men Returning from France

Fifty officers and 1,316 men of the Sixteenth Engineers, one of the first of the railway constructing organizations to enter the war, arrived at New York city on April 22 on the transport "Panaman" and were sent to Camp Upton, whence they will be returned to Detroit, Mich., for demobilization. They are mostly Ohioans. The work of this regiment in France was the building of freight classification yards, putting up the great hospital at Nesves and building railroads. It was in March, 1918, when the British fighters were hard pressed, that these Americans threw down their picks and shovels and took up rifles to stem the mighty German drive.

The regiment was ordered on duty with the American Army on October 1, 1918, and began building light railways around Montfaucon. It was close to the front at the battle of the Meuse, at Verdun, Sedan and Stenay. Since the armistice these men have been laying light railways in the mining districts of Lorraine.

The 108th Company, Transportation Corps, commanded by Capt. F. R. Fitzpatrick, also came on the "Panaman." The company was originally the Nineteenth Engineers, made up chiefly of Pennsylvania Railroad men. They went across in May, 1917.

Companies C and D of the Eleventh Engineers also arrived in New York this week on the transport "Santa Teresa." The Eleventh left New York in July, 1917, and was the first American regiment to be received by the King of England. The regiment assisted in handling tanks in advance of the attack on Cambrai in November, 1917, and was in some severe fighting.

In March, 1918, while engaged in railroad yard construction, the regiment was hurriedly sent to the British front near Arras, and later near Bethune, where the men worked on intrenchments and were held in readiness to serve as combat troops in event of further German attacks. While here the regiment suffered further casualties and earned its second citation from the British.

In June the regiment was again sent back to railroad work, but in July, the first battalion was sent to serve with the first army of the American forces east of Paris, and Company E for a short time was in the Chateau Thierry salient. In September the entire regiment went with the First Army to the St. Mihiel front, where Lieutenant Charles T. Cusick was killed.

The rest of the Eleventh, with Colonel William Barclay Parsons, will probably reach New York this week.

RAILWAY AGE

REVENUES AND EXPENSES OF RAILWAYS									
TWO MONTHS OF CALENDAR YEAR 1919					Operating expenses				
Name of road.		Average mileage operated during period.		Freight.	Passenger. (inc. misc.)	Maintenance of Way and structures.	Operating ratio.	Operating income (or loss).	Railway tax, accruals.
Freight.	Passenger.	Operating revenues—Total	Total	Traffic.	Traffic.	General.	Total.	Railway tax.	Railway tax, accruals.
295,632	\$124,357	\$448,180	\$114,238	\$21,011	\$21,011	\$113,834	\$13,346	\$10,622	\$7,404
141	1,146,939	317,064	145,522	23,105	23,105	1,332,029	86,062	49,122	89,137
312	557,642	1,637,834	145,522	23,105	23,105	34,523	86,062	26,200	88,844
301	558,473	1,601,857	155,303	23,105	23,105	34,523	86,062	32,554	88,833
8,635	17,754,605	25,597,742	155,303	23,105	23,105	34,523	86,062	2,099,663	10,047
93	546,871	1,139,496	169,338	12,906	12,906	5,940,402	69,232	5,197,532	1,009,663
639	248,946	2,145,509	145,522	18,756	18,756	6,903,171	78,133	5,197,532	1,009,663
177	8,070,164	3,188,448	145,522	18,756	18,756	20,077,691	75,55	107,469	17,000
1,415	4,919,300	17,517,213	145,522	23,839	23,839	9,863,616	75,55	107,469	17,000
118	185,54	40,291	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
311	148,261	627,051	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
217	1,146,939	317,064	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
5,145	8,635	17,754,605	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
91	121,380	52,331	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
87	121,380	133,651	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
632	715,563	235,474	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
589	2,137,289	234,269	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
589	185,54	475,653	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
313	148,261	627,051	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
282	879,442	1,000,192	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
1,982	1,870,424	1,093,156	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
684	4,941,275	1,093,156	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
301	884,797	456,324	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
411	579,835	155,029	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
312	336,708	495,015	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
269	1,392,923	4,969,161	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
890	1,263,400	4,788,96	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
657	1,195,295	4,199,403	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
10,273	14,969,173	4,663,346	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
337	1,221	528,089	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
474	9,732	144,424	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
2,486	7,983,408	1,379,673	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
7,731	10,382,870	4,311,069	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
1,749	2,647,758	1,074,161	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
544,161	4,29,910	1,42,900	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
95,803	439,641	1,14,000	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
692,594	2,608,018	263,739	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
1,984,720	1,984,720	1,15,267	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
1,221	1,221	1,221	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
13,707	13,707	13,707	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
2,384,457	32,846	4,128,455	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
7,731	1,717,667	2,384,457	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
2,395	1,692,025	4,311,069	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
1,411	323,644	323,644	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
955	8,229,170	3,962,736	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
321	1,984,720	1,984,720	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
3,735,205	3,735,205	100,524	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
2,640	1,671,777	1,671,777	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
599	451,625	451,625	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
255	135,306	135,306	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
381	323,644	323,644	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
163	353,057	122,455	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
457	155,670	45,197	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
74,777	262,545	74,777	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
141	141,816	141,816	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
1,989	10,327,000	1,808,805	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
253	1,076,092	1,665,092	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
173	1,316,909	1,316,909	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
161	1,316,909	1,316,909	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
1,989	1,316,909	1,316,909	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
264	1,076,092	1,076,092	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
599	451,625	451,625	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
255	1,671,777	1,671,777	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
381	1,671,777	1,671,777	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
163	1,671,777	1,671,777	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
457	1,671,777	1,671,777	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
74,777	1,671,777	1,671,777	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
141	1,671,777	1,671,777	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
1,989	1,671,777	1,671,777	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
264	1,671,777	1,671,777	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
599	451,625	451,625	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
255	1,671,777	1,671,777	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
381	1,671,777	1,671,777	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
163	1,671,777	1,671,777	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
457	1,671,777	1,671,777	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
74,777	1,671,777	1,671,777	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
141	1,671,777	1,671,777	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
1,989	1,671,777	1,671,777	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
264	1,671,777	1,671,777	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
599	451,625	451,625	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
255	1,671,777	1,671,777	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
381	1,671,777	1,671,777	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
163	1,671,777	1,671,777	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
457	1,671,777	1,671,777	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
74,777	1,671,777	1,671,777	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
141	1,671,777	1,671,777	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
1,989	1,671,777	1,671,777	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
264	1,671,777	1,671,777	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
599	451,625	451,625	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
255	1,671,777	1,671,777	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
381	1,671,777	1,671,777	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
163	1,671,777	1,671,777	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
457	1,671,777	1,671,777	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
74,777	1,671,777	1,671,777	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
141	1,671,777	1,671,777	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
1,989	1,671,777	1,671,777	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
264	1,671,777	1,671,777	145,522	18,756	18,756	1,107,356	13,154	33,184	2,657
599	451,6								

REVENUES AND EXPENSES OF RAILWAYS

TWO MONTHS OF CALENDAR YEAR 1919—CONTINUED

Name of road.	Average mileage operated during period.			Operating revenues— Freight. Passen- ger. (inc. misc.)			Maintenance of Equipment. Way and structures.			Trans- portation.			General.			Total.			Operating ratio.			Net from railway operation.			Railway tax accruals.			Operating income comp. with last year.			Increase (or decrease)				
Galveston Wharf	13	\$588,866	\$344,932	\$137,944	\$23,699	\$1,718	\$49	\$58,514	\$2,097	\$102,460	74.28	\$35,664	\$22,800	\$12,664	\$12,664	\$12,664	\$12,664	\$12,664	\$12,664	\$12,664	\$12,664	\$12,664	\$12,664	\$12,664	\$12,664	\$12,664	\$12,664	\$12,664	\$12,664	\$12,664	\$12,664				
Georgia & Florida R. R.	328	\$109,204	36,771	1,068,741	112,267	163,553	11,962	93,700	34,727	793,738	78.66	215,003	12,900	202,100	12,900	12,900	12,900	12,900	12,900	12,900	12,900	12,900	12,900	12,900	12,900	12,900	12,900	12,900	12,900	12,900	12,900	12,900			
Georgia & Southern Florida	402	464,199	175,468	47,072	35,648	125,076	179,521	10,393	32,551	18,355	664,931	122.50	34,988	8,400	110,493	23,300	110,493	110,493	110,493	110,493	110,493	110,493	110,493	110,493	110,493	110,493	110,493	110,493	110,493	110,493	110,493	110,493	110,493		
Grand Rapids & Indiana	569	713,226	237,334	1,046,255	197,562	282,965	20,000	576,850	45,923	1,125,358	107.56	79,103	50,748	50,748	50,748	50,748	50,748	50,748	50,748	50,748	50,748	50,748	50,748	50,748	50,748	50,748	50,748	50,748	50,748	50,748	50,748				
Grand Trunk Lines in New England	172	504,255	54,999	652,763	181,004	95,856	5,660	510,014	24,426	1,522,319	77,898	882,100	91.05	229,337	23,000	229,337	23,000	23,000	23,000	23,000	23,000	23,000	23,000	23,000	23,000	23,000	23,000	23,000	23,000	23,000	23,000	23,000	23,000	23,000	
Great Northern & Western	1,002	2,263,396	2,450,354	15,084,216	2,262,598	3,371,677	90,687	70,566	301,564	13,263,543	8,335	206,711	1,830,000	1,830,000	1,830,000	1,830,000	1,830,000	1,830,000	1,830,000	1,830,000	1,830,000	1,830,000	1,830,000	1,830,000	1,830,000	1,830,000	1,830,000	1,830,000	1,830,000	1,830,000	1,830,000	1,830,000			
Gulf, Mobile & Ship Island	8,255	11,263,952	170,939	2,451,216	2,451,216	1,068,741	136,038	163,553	152,871	1,155,227	17,111	358,517	104,311	154,852	17,132	37,999	106,735	106,735	106,735	106,735	106,735	106,735	106,735	106,735	106,735	106,735	106,735	106,735	106,735	106,735	106,735	106,735	106,735	106,735	
Gulf, Colorado & Santa Fe	1,927	1,998,674	3,810,877	16,428,173	2,858,530	4,550,982	422,794	21,393	1,220,383	87,140	280,548	79.78	577,982	142,335	831,503	132,877	304,865	132,877	304,865	132,877	304,865	132,877	304,865	132,877	304,865	132,877	304,865	132,877	304,865	132,877	304,865	132,877	304,865	132,877	304,865
Gulf, Mobile & Northern	424	277,385	76,769	950,820	224,254	582,226	11,569	481,138	1,345,723	141,53	206,465	114,133	513,250	513,250	513,250	513,250	513,250	513,250	513,250	513,250	513,250	513,250	513,250	513,250	513,250	513,250	513,250	513,250	513,250	513,250	513,250				
Hocking Valley	350	724,375	170,939	2,451,216	2,451,216	1,068,741	136,038	163,553	152,871	1,155,227	17,111	358,517	104,311	154,852	17,132	37,999	106,735	106,735	106,735	106,735	106,735	106,735	106,735	106,735	106,735	106,735	106,735	106,735	106,735	106,735	106,735	106,735	106,735		
Houston, East & West Texas	190	271,798	133,754	1,068,741	133,754	133,754	60,121	87,243	1,124,926	144,44	206,711	142,437	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531				
Houston & Texas Central	856	8,984,985	3,494,951	1,294,951	1,294,951	74,037	256,783	246,520	16,553	579,173	3,011	1,155,227	87.69	159,244	66,048	90,389	66,048	90,389	66,048	90,389	66,048	90,389	66,048	90,389	66,048	90,389	66,048	90,389	66,048	90,389	66,048	90,389	66,048		
Illinois Central	4,782	11,510,877	3,810,877	16,428,173	2,858,530	4,550,982	422,794	21,393	1,220,383	87,140	280,548	79.78	577,982	142,335	831,503	132,877	304,865	132,877	304,865	132,877	304,865	132,877	304,865	132,877	304,865	132,877	304,865	132,877	304,865	132,877	304,865	132,877	304,865		
Indiana Harbor Belt	116	1,518,523	483,801	2,451,216	2,451,216	1,068,741	136,038	163,553	152,871	1,155,227	17,111	358,517	104,311	154,852	17,132	37,999	106,735	106,735	106,735	106,735	106,735	106,735	106,735	106,735	106,735	106,735	106,735	106,735	106,735	106,735	106,735	106,735	106,735		
International & Great Northern	1,159	352,587	114,740	2,451,216	2,451,216	1,068,741	136,038	163,553	152,871	1,155,227	17,111	358,517	104,311	154,852	17,132	37,999	106,735	106,735	106,735	106,735	106,735	106,735	106,735	106,735	106,735	106,735	106,735	106,735	106,735	106,735	106,735	106,735	106,735		
Karawao & Michigan	176	1,600,598	133,754	1,068,741	133,754	133,754	60,121	87,243	1,124,926	144,44	206,711	142,437	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531				
Kansas City, Mexico & Orient	272	1,600,598	133,754	1,068,741	133,754	133,754	60,121	87,243	1,124,926	144,44	206,711	142,437	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531				
Kansas City, Mexico & Orient of Tex.	465	11,510,877	3,810,877	16,428,173	2,858,530	4,550,982	422,794	21,393	1,220,383	87,140	280,548	79.78	577,982	142,335	831,503	132,877	304,865	132,877	304,865	132,877	304,865	132,877	304,865	132,877	304,865	132,877	304,865	132,877	304,865	132,877	304,865	132,877	304,865		
Kansas City Southern	774	1,842,657	376,771	2,392,956	444,073	524,945	31,754	1,010,180	21,506	21,506	9,075	86,681	2,091,992	87.24	305,964	150,229	293,450	150,229	293,450	150,229	293,450	150,229	293,450	150,229	293,450	150,229	293,450	150,229	293,450	150,229	293,450	150,229	293,450		
Kansas City Terminal Co.	24	100,270	110,278	1,457,610	234,202	465,090	23,816	696,636	47,660	1,463,506	100.40	206,711	142,437	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531			
Kansas City, Salt Lake & Arkansas	387	1,282,102	110,278	1,457,610	234,202	465,090	23,816	696,636	47,660	1,463,506	100.40	206,711	142,437	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531	12,531			
Lake Erie & Western	908	302	258,380	74,289	2,605,201	344,822	82,341	70,560	116,159	108,484	7,864	2,091,992	87.24	305,964	150,229	293,450	150,229	293,450	150,229	293,450	150,229	293,450	150,229	293,450	150,229	293,450	150,229	293,450	150,229	293,450	150,229	293,450			
Louisiana & New England	349	455,885	78,287	555,024	130,326	1,042,657	11,164,266	16,211,010	101,759	58,928	2																								

REVENUES AND EXPENSES OF RAILWAYS

TWO MONTHS OF CALENDAR YEAR 1919—CONTINUED

Name of road.	Operating expenses—Total			Trans- porta- tion.	General.	Total.	Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decrease comp. with last year).
	Maintenance of Equipment.	Way and structures.	(inc. misc.)								
New York, Susq. & Western.....	\$99,864	\$60,443	\$54,112	\$401,461	\$14,742	\$968,151	93.99	\$29,188	\$7,061	\$30,547	\$63,802
Norfolk & Western.....	1,662,917	1,130,334	1,616,434	5,295	\$4,558,846	9,977,318	93.99	1,989,956	\$52,060	1,439,782	330,547
Northern Pacific.....	940,709	523,752	940,709	14,671	4,984,472	41,660	105.36	3,509,482	40,000	90,508	941,512
Northern Pacific.....	1,98,384	135,282	2,64,083	135,282	5,871,395	24,987	105.36	3,668,283	1,033,385	2,634,009	171,345
Northwestern Railroad.....	2,64,083	9,345	404,951	9,345	1,975,947	103,94	105.36	3,668,283	1,441,39	2,634,009	183,569
Short Line, R. & N. Nav. Co.....	927,427	5,431,303	1,038,449	26,656	1,294,992	170,788	87.38	355,927	1,008,555	—173,377	—173,377
Oregon Wash. R. & N. Nav. Co.....	927,427	3,912,755	797,636	652,403	1,664,902	186,474	87.38	229,107	264,269	—127,114	472,739
Panhandle & Santa Fe.....	927,427	14,779,066	14,746,477	209,407	222,811	8,283	101,018	32,427	1,071,521	1,109,457	—6,1341
Pennsylvania Railroad.....	2,55,917	1,908,74	2,64,083	1,908,74	1,908,74	24,987	103,94	103,94	1,033,385	1,441,39	1,033,385
Potomac & Susquehanna & L. & N. R. Co.....	2,64,083	1,908,74	2,64,083	1,908,74	1,908,74	24,987	103,94	103,94	1,033,385	1,441,39	1,033,385
Pitts. & W. Va. & W. Va. & St. L. & N. R. Co.....	2,347	70,166	8,473	4,710,374	705,451	54,801	1,237	1,364,979	1,008,555	—173,377	—173,377
Pitts. & W. Va. & W. Va. & St. L. & N. R. Co.....	2,347	70,166	8,473	4,710,374	705,451	54,801	1,237	1,364,979	1,008,555	—173,377	—173,377
Pitts. & W. Va. & W. Va. & St. L. & N. R. Co.....	2,347	70,166	8,473	4,710,374	705,451	54,801	1,237	1,364,979	1,008,555	—173,377	—173,377
Pitts. & W. Va. & W. Va. & St. L. & N. R. Co.....	2,347	70,166	8,473	4,710,374	705,451	54,801	1,237	1,364,979	1,008,555	—173,377	—173,377
Pitts. & W. Va. & W. Va. & St. L. & N. R. Co.....	2,347	70,166	8,473	4,710,374	705,451	54,801	1,237	1,364,979	1,008,555	—173,377	—173,377
Pitts. & W. Va. & W. Va. & St. L. & N. R. Co.....	2,347	70,166	8,473	4,710,374	705,451	54,801	1,237	1,364,979	1,008,555	—173,377	—173,377
Pitts. & W. Va. & W. Va. & St. L. & N. R. Co.....	2,347	70,166	8,473	4,710,374	705,451	54,801	1,237	1,364,979	1,008,555	—173,377	—173,377
Pitts. & W. Va. & W. Va. & St. L. & N. R. Co.....	2,347	70,166	8,473	4,710,374	705,451	54,801	1,237	1,364,979	1,008,555	—173,377	—173,377
Pitts. & W. Va. & W. Va. & St. L. & N. R. Co.....	2,347	70,166	8,473	4,710,374	705,451	54,801	1,237	1,364,979	1,008,555	—173,377	—173,377
Pitts. & W. Va. & W. Va. & St. L. & N. R. Co.....	2,347	70,166	8,473	4,710,374	705,451	54,801	1,237	1,364,979	1,008,555	—173,377	—173,377
Pitts. & W. Va. & W. Va. & St. L. & N. R. Co.....	2,347	70,166	8,473	4,710,374	705,451	54,801	1,237	1,364,979	1,008,555	—173,377	—173,377
Pitts. & W. Va. & W. Va. & St. L. & N. R. Co.....	2,347	70,166	8,473	4,710,374	705,451	54,801	1,237	1,364,979	1,008,555	—173,377	—173,377
Pitts. & W. Va. & W. Va. & St. L. & N. R. Co.....	2,347	70,166	8,473	4,710,374	705,451	54,801	1,237	1,364,979	1,008,555	—173,377	—173,377
Pitts. & W. Va. & W. Va. & St. L. & N. R. Co.....	2,347	70,166	8,473	4,710,374	705,451	54,801	1,237	1,364,979	1,008,555	—173,377	—173,377
Pitts. & W. Va. & W. Va. & St. L. & N. R. Co.....	2,347	70,166	8,473	4,710,374	705,451	54,801	1,237	1,364,979	1,008,555	—173,377	—173,377
Pitts. & W. Va. & W. Va. & St. L. & N. R. Co.....	2,347	70,166	8,473	4,710,374	705,451	54,801	1,237	1,364,979	1,008,555	—173,377	—173,377
Pitts. & W. Va. & W. Va. & St. L. & N. R. Co.....	2,347	70,166	8,473	4,710,374	705,451	54,801	1,237	1,364,979	1,008,555	—173,377	—173,377
Pitts. & W. Va. & W. Va. & St. L. & N. R. Co.....	2,347	70,166	8,473	4,710,374	705,451	54,801	1,237	1,364,979	1,008,555	—173,377	—173,377
Pitts. & W. Va. & W. Va. & St. L. & N. R. Co.....	2,347	70,166	8,473	4,710,374	705,451	54,801	1,237	1,364,979	1,008,555	—173,377	—173,377
Pitts. & W. Va. & W. Va. & St. L. & N. R. Co.....	2,347	70,166	8,473	4,710,374	705,451	54,801	1,237	1,364,979	1,008,555	—173,377	—173,377
Pitts. & W. Va. & W. Va. & St. L. & N. R. Co.....	2,347	70,166	8,473	4,710,374	705,451	54,801	1,237	1,364,979	1,008,555	—173,377	—173,377
Pitts. & W. Va. & W. Va. & St. L. & N. R. Co.....	2,347	70,166	8,473	4,710,374	705,451	54,801	1,237	1,364,979	1,008,555	—173,377	—173,377
Pitts. & W. Va. & W. Va. & St. L. & N. R. Co.....	2,347	70,166	8,473	4,710,374	705,451	54,801	1,237	1,364,979	1,008,555	—173,377	—173,377
Pitts. & W. Va. & W. Va. & St. L. & N. R. Co.....	2,347	70,166	8,473	4,710,374	705,451	54,801	1,237	1,364,979	1,008,555	—173,377	—173,377
Pitts. & W. Va. & W. Va. & St. L. & N. R. Co.....	2,347	70,166	8,473	4,710,374	705,451	54,801	1,237	1,364,979	1,008,555	—173,377	—173,377
Pitts. & W. Va. & W. Va. & St. L. & N. R. Co.....	2,347	70,166	8,473	4,710,374	705,451	54,801	1,237	1,364,979	1,008,555	—173,377	—173,377
Pitts. & W. Va. & W. Va. & St. L. & N. R. Co.....	2,347	70,166	8,473	4,710,374	705,451	54,801	1,237	1,364,979	1,008,555	—173,377	—173,377
Pitts. & W. Va. & W. Va. & St. L. & N. R. Co.....	2,347	70,166	8,473	4,710,374	705,451	54,801	1,237	1,364,979	1,008,555	—173,377	—173,377
Pitts. & W. Va. & W. Va. & St. L. & N. R. Co.....	2,347	70,166	8,473	4,710,374	705,451	54,801	1,237	1,364,979	1,008,555	—173,377	—173,377
Pitts. & W. Va. & W. Va. & St. L. & N. R. Co.....	2,347	70,166	8,473	4,710,374	705,451	54,801	1,237	1,364,979	1,008,555	—173,377	—173,377
Pitts. & W. Va. & W. Va. & St. L. & N. R. Co.....	2,347	70,166	8,473	4,710,374	705,451	54,801	1,237	1,364,979	1,008,555	—173,377	—173,377
Pitts. & W. Va. & W. Va. & St. L. & N. R. Co.....	2,347	70,166	8,473	4,710,374	705,451	54,801	1,237	1,364,979	1,008,555	—173,377	—173,377
Pitts. & W. Va. & W. Va. & St. L. & N. R. Co.....	2,347	70,166	8,473	4,710,374	705,451	54,801	1,237	1,364,979	1,008,555	—173,377	—173,377
Pitts. & W. Va. & W. Va. & St. L. & N. R. Co.....	2,347	70,166	8,473	4,710,374	705,451	54,801	1,237	1,364,979	1,008,555	—173,377	—173,377
Pitts. & W. Va. & W. Va. & St. L. & N. R. Co.....	2,347	70,166	8,473	4,710,374	705,451	54,801	1,237	1,364,979	1,008,555	—173,377	—173,377
Pitts. & W. Va. & W. Va. & St. L. & N. R. Co.....	2,347	70,166	8,473	4,710,374	705,451	54,801	1,237	1,364,979	1,008,555	—173,377	—173,377
Pitts. & W. Va. & W. Va. & St. L. & N. R. Co.....	2,347	70,166	8,473	4,710,374	705,451	54,801	1,237	1,364,979	1,008,555	—173,377	—173,377
Pitts. & W. Va. & W. Va. & St. L. & N. R. Co.....	2,347	70,166	8,473	4,710,374	705,451	54,801	1,237	1,364,979	1,008,555	—173,377	—173,377
Pitts. & W. Va. & W. Va. & St. L. & N. R. Co.....	2,347	70,166	8,473	4,710,374	705,451	54,801	1,237	1,364,979	1,008,555	—173,377	—173,377
Pitts. & W. Va. & W. Va. & St. L. & N. R. Co.....	2,347	70,166	8,473	4,710,374	705,451	54,801	1,237	1,364,979	1,008,555	—173,377	—173,377
Pitts. & W. Va. & W. Va. & St. L. & N. R. Co.....	2,347	70,166	8,473	4,710,374	705,451	54,801	1,237	1,364,979	1,008,555	—173,377	—173,377
Pitts. & W. Va. & W. Va. & St. L. & N. R. Co.....	2,347	70,166	8,473	4,710,374	705,451	54,801	1,237	1,364,979	1,008,555	—173,377	—173,377
Pitts. & W. Va. & W. Va. & St. L. & N. R. Co.....	2,347	70,166	8,473	4,710,374	705,451	54,801	1,237	1,364,979	1,008,555	—173,377	—173,377
Pitts. & W. Va. & W. Va. & St. L. & N. R. Co.....	2,347	70,166	8,473	4,710,374	705,451	54,801	1,237	1,364,979	1,008,555	—173,377	—173,377
Pitts. & W. Va. & W. Va. & St. L. & N. R. Co.....	2,347	70,166	8,473	4,710,374	705,451	54,801	1,237	1,364,979	1,008,555	—173,377	—173,377
Pitts. & W. Va. & W. Va. & St. L											

Increase in Rates in Germany

The new Minister of Prussian Railroads foresees the necessity of raising all freight rates 60 per cent (exception made in the case of potatoes and wheat, if necessary). He proposes besides an increase of passenger rates with the following percentages: 4th class, 20 per cent; 3rd class, 25 per cent; 2nd class, 35 per cent; 1st class, 100 per cent. If the financial results of exploitation improve, the increase will be reduced or even abolished. The new Minister of Railroads is an adversary of the four class system of passengers, and wishes to reduce it to two classes. However, he considers this reform actually impossible. He has been authorized to negotiate with the federated German governments on the question of unification of rates, but not to bind the Prussian government in this question.—*Vorwaerts*.

Chicago to New York in Six Hours, 50 Minutes

Captain E. F. White, an aviator of the United States army, flying in a DeHaviland biplane, made the trip from Chicago to New York on Saturday, April 19, without a stop, in six hours, 50 minutes, beating all previous speed records for that distance. The airplane has a twelve-cylinder Liberty motor, and its gasoline tank holds 194 gallons. Captain White had with him a mechanic. He left Ashburn field, Chicago, at 9:50 a. m., and landed at Hazelhurst field, Mineola, N. Y., at 5:40 p. m. (4:40 p. m. Central time). Mineola is 20 miles east of the New York post office, and the distance through from Chicago is calculated at 727 miles, making the rate of speed 106.38 miles an hour. Captain White reported that the temperature, at the great altitude at which he flew, was not uncomfortably cold.

On Monday, April 21, Captain White flew from New York to Washington in one hour, 50 minutes, starting at 11:30 a. m., and arriving at 1:20 p. m.

The best regular passenger train time between New York and Chicago is 20 hours, and the best time which has ever been made between these cities by a special train is 16 hours, 30 minutes. Between New York and Washington the best regular schedule is five hours, and the best time on record is four hours, 18 minutes.

Loans by War Finance Corporation to Railroads

The War Finance Corporation has announced the following list of loans made by it to railroads up to April 10:

Baltimore & Ohio.....	\$4,450,000
Baltimore & Ohio.....	1,000,000
Buffalo, Rochester & Pittsburgh.....	1,000,000
Central of Georgia.....	900,000
Chesapeake & Ohio.....	25,000
Chesapeake & Ohio.....	275,000
Chesapeake & Ohio.....	2,070,000
Chicago, Mil. & St. Paul.....	11,500,000
Chicago, Rock Island & Pacific.....	9,700,000
Chicago, Rock Island & Pacific.....	730,000
Illinois Central.....	1,500,000
Illinois Central.....	10,500,000
New York Central.....	13,500,000
New York Central.....	3,000,000
New York Central.....	4,000,000
Southern.....	5,264,480
Southern.....	735,520
Southern.....	792,770
Southern.....	562,500
Baltimore & Ohio.....	4,600,000
Baltimore & Ohio.....	2,000,000
Buffalo, Rochester & Pittsburgh.....	208,800
Central of Georgia.....	1,121,000
Chesapeake & Ohio.....	250,000
Chesapeake & Ohio.....	800,000
Chicago, Burlington & Quincy.....	3,977,600
Chicago, Ind. & Louisville.....	1,400,000
Chicago, Mil. & St. Paul.....	1,600,000
Chicago, Rock Island & Pacific.....	2,800,000
Cleveland, C. C. & St. L.....	340,000
Cumberland & Manchester.....	175,000
Erie.....	12,768,420
Lake Erie & Western.....	62,400
Lehigh Valley.....	2,400,000
Michigan Central.....	992,000
Missouri Pacific.....	1,120,000
New York Central.....	2,000,000
Wheeling & Lake Erie.....	618,000
Boston & Maine.....	728,000
Erie.....	2,500,000
Western Maryland.....	931,000
Walker D. Hines, Director General of Railroads.....	50,000,000
Total.....	\$164,897,490

Traffic News

The New York State Barge Canal is to be opened on May 1. The United States Railroad Administration has announced that no action will be taken by the government toward regulating the rates for transportation except on the boats owned or controlled by the government.

C. D. Boyd, formerly general coal and coke agent of the Louisville & Nashville, has become traffic manager for the coal operators of eastern and southeastern Kentucky and Tennessee, members of the Southern Appalachian Coal Operators' Association, Harlan County Coal Operators' Association and Hazard Coal Operators' Exchange.

The Refractories Traffic Association of the St. Louis district was recently organized at St. Louis, Mo., by traffic agents of fire brick and clay products companies located in this district. The object of the association is to keep in touch with all matters pertaining to freight rates on the various commodities manufactured by the companies. Meetings will be held monthly.

The Railroad Commission of Texas has issued an address to the commercial and shipping interests of that state, calling for information concerning experience with the sailing-day plan, adopted at freight stations in that state, with a view to presenting a protest to the United States Railroad Administration. The Texas Commission believes the plan is inconvenient to the shipping public.

Freight rates by lake, this season, as approved by the United States Shipping Board, are published as follows: Grain, from Lake Superior and Lake Michigan ports to Lake Erie, in April, 3½ cents a bushel; in May, 3 cents a bushel. Ore, to Lake Erie, 80 cents a ton. Coal, from Lake Erie ports, 42.5 cents a ton. Grain rates to Goderich, to Port Huron and to Collingwood, will be one-half cent a bushel less than to Lake Erie.

The Houston (Tex.) Traffic Club has adopted resolutions opposing government ownership or operation of railroads and outlining desirable legislation to accompany the return of the roads to private ownership. The Atchison (Kan.) Chamber of Commerce has taken similar action including also the telegraph and telephone lines. The resolutions ask that Congress take immediate steps to return the railroads to private ownership and to vest jurisdiction over the issuance of securities in the same national governmental agency by which freight and passenger rates are controlled.

The Fruit Growers' Express, Chicago, has been cited by the Federal Trade Commission on charges of making contracts with railroads to create a monopoly in the interstate transportation of fresh fruits and vegetables. The commission "has reason to believe that a complete monopoly already has been established over the Atlantic Coast Line, Seaboard Air Line, Florida East Coast, New York, Philadelphia & Norfolk, and other lines." The contracts complained of stipulate that the railroad shall use the car line's equipment exclusively in the movement of fruits and vegetables under refrigeration. Answer is called for by June 1.

Export freight on hand at North Atlantic ports for the week ended April 16 totaled 32,994 carloads, exclusive of bulk grain and coal, compared with 33,619 for the same day of the preceding week. For the same period there were 8,161 carloads of export food on hand at these ports, exclusive of bulk grain, which was a decrease of 2,219 cars, compared to the week previous. For the week ended April 16 there were 19,240,216 bushels of grain in elevators at North Atlantic ports; received during the week 6,099,116 bushels; cleared 7,288,986 bushels. At South Atlantic and Gulf ports there were 11,329 carloads of export freight on hand for the week mentioned, compared with 11,855 for the week previous; grain in elevators, 3,924,898 bushels.

Commission and Court News

Court News

Federal Control of Railroads—

Constitutionality of 1918 Statute

In an action in the New York Supreme Court, Erie County, against the Pennsylvania for the death of a brakeman, which happened while the railroad was being operated by the federal authorities, the chief question involved was the constitutionality of the Act of Congress of March 21, 1918, in so far as it authorized the maintenance of actions and the recovery of judgments against carriers for damages sustained by employees and others while the railroad is being operated by and under the direction of the federal authorities. The court holds that the act is unconstitutional in so far as it authorizes the recovery of judgments against carriers for the negligence or default of the government or its agents and the enforcement of such judgments against such property of the carriers as is not taken under federal control. It considers that this amounts to depriving the corporation of its property without due process of law. The court says that it may almost take judicial notice of the fact that railroad companies, or many of them, do own and possess other property than that employed in the transportation of property and freight, which latter alone was taken under government control. Many of the companies have large holdings of the stock and bonds of subsidiary companies. Many, if not all, in addition, owned considerable sums of money on hand and in bank as the result of their operations. The federal government took into its possession and control none of this class of property and all such property can be reached by judgment creditors in appropriate proceedings to satisfy valid judgments against the corporation.

The court cited in support of its opinion in the present case the recent decision of the federal district court for the Eastern District of South Carolina in *U. S. Railroad Administration v. Burch*, 254 Fed. 140 (November 30, 1918), where the United States Director of Railroads sought to enjoin a sale under execution, under a judgment obtained against the Atlantic Coast Line of certain lots owned by the company, and claimed not to have been taken over by the government. The court there held that the acts of Congress of August 29, 1916, did not authorize the Director General of Railroads to take possession of lands belonging to a railroad company which are not used in the business as a carrier, and that a sale of such lands under execution will be enjoined by the court.

The federal government, in the control and operation of the railroad properties taken over, is in no sense the agent or representative of the railroad companies to which the systems belong. By the 12th section of the act of 1918 the moneys and other property derived from the operation of the railroads during federal control are declared to be the property of the United States."

In view of the importance of the questions and the far-reaching effect of such a holding, the court considered they should be passed on by courts of review; and as the appellate courts have expressed the opinion that constitutional questions should be reserved by trial courts for their determination, it was held that the exceptions taken on the trial be ordered heard in the first instance at the Appellate Division of the Supreme Court, with a stay of entry of judgment on the verdict pending the hearing and disposition of the case in that court. *Schumacher v. Pennsylvania Railroad Company*. Decided March 26, 1919.

Condition of the Roumanian Railroads.—The condition of the Roumanian railroads, which before the war were prosperous, becomes more and more one of the chief difficulties in the return to economic life. There is only one train a day between the different parts of the country, instead of three to seven, which circulated in normal times. The wagons are partly useless.

Equipment and Supplies

Locomotives

THE PENNSYLVANIA EQUIPMENT COMPANY, 1420 Chestnut street, Philadelphia, Pa., wishes to purchase one, 40 to 50-ton, consolidation or 10-wheel locomotive, with a short rigid wheel-base, 36 to 44 in. wheel centers, and 180 to 200 lb. steam pressure; one 65-ton, 2-6-2 type locomotive, and one 4-4-0 type locomotive with 14 by 22 in. cylinders. This company also wants a second-hand, standard gage, four driver saddle tank locomotive, with 10 or 11 by 16 in. cylinders.

Locomotive Deliveries

The following new locomotives were shipped to railroads under federal control during the week ended April 12:

Works	Road	Number	Type
American	C. M. & St. P.	15	USRA Mikado
	Cent. of Ga.	1	Mallet
	Erie R. R.	3	USRA Pacific
	C. & N. W.	3	USRA 6-w. Sw.
		22	
Baldwin	Norf. & W.	1	Mallet
	C. B. & Q.	1	Mikado
	Phil. & R.	1	Consol.
	Penn. R. R.	1	Mikado
	C. B. & Q.	4	USRA Mikado
	C. C. & O.	1	Mikado
	Gt. North.	2	8-w. Sw.
	A. T. & S. F.	1	Mikado
	C. C. & O.	1	Mallet
		13	
	Total	35	

Passenger Cars

THE PENNSYLVANIA EQUIPMENT COMPANY, 1420 Chestnut street, Philadelphia, is in the market for one gasoline motor car with baggage compartment, seating 25 to 30 people.

Car Deliveries Week Ended April 5

Road	Number	Type	Manufacturer	Total accepted for given roads
Sou. Pac.	45	50 Ton S. S. Box...	Am. Car & Fdy. Co.	100
C. C. & O.	48	50 Ton S. S. Box...	Bettendorf Co.	276
Sou. Pac.	142	50 Ton S. S. Box...	Haskell & Barker....	331
Sou. Pac.	200	50 Ton S. S. Box...	Pullman Car Co.	200
N. & W.	70	50 Ton S. S. Box...	Pullman Car Co.	800
P. McK. & Y.	107	70 Ton L. S. Gond...	Pressd St. Car Co.	130
Total	612			

Car Deliveries Week Ended April 12

New standard cars were accepted during the week ended April 12, as follows:

Road	Number	Type	Manufacturer	Total accepted for given roads
C. C. & O.	24	50-ton S. S. Box...	Bettendorf Co.	300
Sou. Pac.	146	50-ton S. S. Box...	Haskell & Barker....	477
Sou. Pac.	200	50-ton S. S. Box...	Pullman Car Co.	400
P. McK. & Y.	77	70-ton L. S. Box...	Pressd St. Car Co.	207
Total	447			

Freight Cars

W. W. HEDGEMAN, St. Paul, Minn., is in the market for one flat car.

THE COMMONWEALTH EDISON COMPANY, Chicago, is inquiring for one 66-ton concentrated-load well-car.

THE GOVERNMENT OF THE NETHERLANDS, COLONIAL DEPARTMENT, is inquiring for one motor inspection car for export.

THE NEW HOWARD COLLIERY COMPANY, Huntington, W. Va., has ordered 59 cars from the American Car & Foundry Company.

Supply Trade News

J. S. Cullinan has recently been elected president of the **Galena-Signal Oil Company, New York**.

J. H. Deppeler of the **Metal & Thermit Corporation, Jersey City, N. J.**, has been elected a director of the **American Welding Society**.

Briggs & Turvias, Inc., iron and steel, Chicago, have opened a New York office at 1805 Equitable Trust building, to be under the direction of the president of the company, **Carl R. Briggs**.

The United States Switch Company, Eau Claire, Wis., has let contracts for the erection of additions to its iron and steel foundry and machine shops and work is now under way on the new buildings.

The Illinois Manufacturers' Association, Chicago, is planning to open a New York office as a result of recommendations of its foreign trade committee. The committee states that particular attention will be paid to buyers from the Philippines and the Orient.

Charles Gilman, eastern manager at New York for the **Massey Concrete Products Corporation**, Chicago, has been elected vice-president, effective May 1. Mr. Gilman's headquarters will be in New York, and he will be in charge of sales in the eastern territory.

Geo. W. Hoover, formerly in charge of the procurement of railway material in the Construction Division of the army, has been appointed manager of the St. Louis office of the **Buda Company, Chicago**. The Buda Company opened a St. Louis office on April 1 at 2025 Railway Exchange building.

T. J. Hudson, of the **Chicago Pneumatic Tool Company**, has been appointed acting manager of the pneumatic tool sales division, effective April 15, succeeding **F. H. Waldron**, who returns to Minneapolis, Minn., as district manager of sales for the Minneapolis territory.

B. L. Swearingen, formerly assistant general freight agent on the Missouri Pacific, and for the past year supervisor of oil traffic for the Railroad Administration with headquarters at Kansas City, Mo., has been appointed traffic manager of the **Sinclair Refining Company, Chicago**, to succeed G. F. Rung, who has been assigned to other duties.

The Indian Refining Company, Lawrenceville, Ill., will commence work immediately on the construction of a car repair shop at Lawrenceville. The new shop will be of structural iron and brick construction, one story high and 85 ft. by 327 ft. The work will be done by the company's own forces. The approximate cost is \$75,000.

The American Railway Signals Company, Terre Haute, Ind., has been organized with a capitalization of \$200,000 by Harry W. Beggs, Thomas G. Beggs, John T. Beasley, John F. O'Brien and John H. Beasley. The new company will manufacture railroad signal devices and holds a license contract with the Julian-Beggs Signal Company giving it the sole right to manufacture, sell and install the Julian-Beggs Signal Company devices.

The Hess-Bright Manufacturing Company, the S K F Ball Bearing Company, the Atlas Ball Company and the Hubbard Machine Company have announced a combination effective May 1, under the name of S K F Industries, Inc., to sell the products of the above companies through one central organization. The new company will offer a comprehensive line of ball bearings, including the Hess-Bright deep-groove type, S K F self-aligning radial and thrust bearings and ball bearing pillow-blocks and shafting hangers. S K F Industries, Inc., is simply a holding, sales and engineering organization under the direction of B. G. Prytz, president; W. L. Batt, vice-president; J. P. Walsh, comptroller, and S. B. Taylor, sales manager. The principal office will be at 165 Broad-

way, New York, with branches at Boston, Philadelphia, Atlanta, Buffalo, Cleveland, Detroit, Cincinnati, Chicago and San Francisco.

Advisory and Purchasing Engineers

Earl Wheeler, O. A. Mechlin and Frank Rhea announce their association in the firm of **Wheeler, Mechlin & Rhea**, as advisory and purchasing engineers with office at 90 West street, New York. Its purpose will be to conduct an advisory and purchasing engineering business, organized to furnish service to foreign and domestic clients purchasing machinery and engineering materials in the United States, to be used to construct, maintain and operate properties.

By the term "machinery and engineering materials" is meant those classes of materials, equipment, apparatus and supplies which demand engineering specifications or plans as a fundamental basis of purchase, including general construction materials and plant; steam railway materials, equipment and supplies; electric railway materials, equipment and supplies; electric light and power apparatus and supplies; shop and factory equipment; harbor, wharf, dredging and freight handling equipment; highway, street, sanitation and water supply plant and materials; mining and smelting plant equipment, etc.

The firm in addition to acting as advisory and purchasing engineers will arrange co-ordinated production programs for shipments from one or several manufacturing plants, will follow production schedules at the factories by a follow up system of correspondence and personal visits, and supervise inspection, packing and shipments by rail and water. It will also follow through export bills of lading and co-ordinate shipments

from different sources at ship's side and will combine inspection certificates of quality, quantity and packing with bills of lading and secure all possible discounts by applying the client's established credits.

The entire compensation of the firm will be derived from the clients served, in direct fees for advisory engineering and commissions on purchases made. No compensation will be received in the form of selling commissions, as the firm will conduct negotiations as the authorized agent of its client.

Earl Wheeler is a member of the American Institute of Electrical Engineers. He has served as director of the department of electrical and mechanical engineering, engineer school; Corps of Engineers, United States Army; as treasurer and general manager of the Electric Speedometer Company, Washington, D. C.; and as local manager of the General Electric Company at Washington, D. C. He had the rank of lieutenant colonel of engineers, United States Army, and



Earl Wheeler



Frank Rhea

acted as chief of the machinery and engineering materials division, office of the Director of Purchase, General Staff, which was formerly the General Engineer Depot, the purchasing engineers for the Corps of Engineers during the participation of the United States in the world war.

O. A. Mechlin is an associate member of the American Society of Civil Engineers. He is a member of the firm of Mechlin & Starr, architectural engineers, Washington, D. C. He served as lieutenant-commander, Civil Engineer Corps, United States navy, and was the officer in charge of construction of the additions to the Naval Academy; the Navy and Munitions building, Washington, D. C. (the largest concrete-steel office building in the world); and was public works officer, Navy Yard, Philadelphia, Pa., in charge of construction of shops, buildings, wharves, power plant, dry-dock and ship building ways.

Frank Rhea is a member of the American Society of Civil Engineers, the American Railway Engineering Association, and the Railway Signal Association. He was at one time assistant supervisor and supervisor of track on the Norfolk & Western, and later served on the Pennsylvania as chief signal inspector, assistant engineer and division engineer, respectively. He was also at one time an apprentice with the Union Switch & Signal Company, superintendent of construction of the Clamond Telephone Company and commercial engineer in the railway engineering department of the General Electric Company. He later served as district engineer of the Eastern District, Division of Valuation, Interstate Commerce Commission; and as a commercial engineer of the Bureau of Foreign and Domestic Commerce made a study of the markets for railway materials in New Zealand, Australia, the Philippine Islands, China and Japan.

John T. Dickerson, general manager of the **Strauss Bascule Bridge Company**, Chicago, died April 14 at his home, Oak Park, Ill., at 40 years of age. Mr. Dickerson was a graduate civil engineer of Rose Polytechnic Institute of Terre Haute, Ind., class of 1902. He had been identified with the company for seven years. Prior to 1912 he was assistant engineer and general sales engineer with the Scherzer Rolling Lift Bridge Company of Chicago for a period of 5 or 6 years, and before that he was employed in the bridge departments of the Chicago, Burlington & Quincy and the Chicago, Rock Island & Pacific, and the American Bridge Company of St. Louis, Mo.

Carl H. Peterson, western representative of the Baldwin Locomotive Works, Philadelphia, Pa., and the Standard Steel Works Company, Philadelphia, with headquarters at Chicago, has resigned, effective May 1, to become president of the Iron Mountain Company, Chicago, and vice-president of the Jackson-Park Machine Company, Chicago. He was born in Chicago on November 9, 1872, and began his business career as an engineer and draftsman with Swift & Company, Chicago, in 1889. From this time until May, 1919, he has been consecutively engineer for the Railway Lighting & Manufacturing Company, Chicago; engineer and salesman for the Safety Car Heating & Lighting Company, Chicago; engineer and salesman for the Pressed Steel Car Company; assistant to the western representative of the Baldwin Locomotive Works and the Standard Steel Works; southwestern representative of the same firms, with headquarters at St. Louis, Mo., and western representative for the same firms, which position he has held prior to his recent election. Mr. Peterson will be succeeded by Arthur S. Globe, southwestern representative of the Baldwin Locomotive Works and the Standard Steel Works Company, with headquarters at St. Louis, who will have the title of manager of the Chicago office, the title of representative having been abolished. Paul G. Cheatham, assistant to the western representative, with headquarters at Chicago, will succeed Mr. Globe as manager of the St. Louis office.

American Steel Foundries

The stockholders of the American Steel Foundries Company, Chicago, at a special meeting held in New York on April 22, voted unanimously in favor of the plan submitted by the board of directors to create a preferred stock issue of \$25,000,000 and to split the present capital of 178,140 shares or \$17,814,000 into 515,520 shares of par value of \$33 1/3

per share. These latter shares will be exchanged, three for one, for the present stock.

This plan was formulated some time ago by the board of directors to provide capital for the acquisition of additional properties. President R. P. Lamont, in outlining the plan at the meeting, explained that only a part of the new preferred stock would be issued at this time and only in exchange for property that would earn the preferred dividend, leaving the balance of earnings for the common. The rise in the present shares on the New York Stock Exchange within the last few days from around 82 to 96 on April 22, is indicative that the preferred issue will not stand in the way of dividends on what will now be the common stock.

Trade Publications

SLOTTING MACHINES.—Latest information on three types of Newton slotting machines in a variety of sizes is given by the Newton Machine Tool Works, Inc., Philadelphia, Pa., in catalogue 49-A, which also contains photographs and brief information on upright generating planers, cold saw cutting off machines, locomotive link grinding machines, horizontal milling machines, vertical milling machines, rotary planers, keyseat milling machines and duplex locomotive rod boring machines.

SHOP PRODUCTION.—“The Missing Link” is the title of a 16-page booklet issued by the Gisholt Machine Company, Madison, Wis., explaining the principle of the Periodograph and the advantages to be secured from its installation. This machine was developed to make it possible to secure an accurate record of the time actually spent in producing and the loss of time lost by workmen waiting for materials, broken machines, lack of power, and other causes of delay. The booklet shows several cards which are used for registering the time lost, with the reasons, and a chart showing the record of a machine for an entire year.

STEAM PUMPS.—Several bulletins have been issued by the A. S. Cameron Steam Pump Works, New York, describing their pumps, which are bound together in a heavy manila folder. Included among these are bulletin 7204, which explains the general characteristics and operation of Cameron steam piston and plunger pumps; bulletin 7152, showing the construction of a single suction volute centrifugal pump, with tables of capacities, speeds and horsepowers; bulletin No. 7251, covering two-stage motor driven and three-stage turbine driven centrifugal pumps and giving complete information regarding their operation, specifications and detail parts; and bulletin 7150, describing and illustrating the general design of a double suction volute centrifugal pump, including the results of tests made with this pump and useful information regarding the friction and pressure of water.

HISTORY OF RAIL MANUFACTURE.—Robert W. Hunt, president of Robert W. Hunt & Co., Chicago, has prepared a booklet on the occasion of his recent eightieth birthday outlining in detail the early development of Bessemer rail manufacture. The book contains a paper entitled “The History of the Bessemer Manufacture in America,” which was presented by him at the American Institute of Mining Engineers at its centennial meeting held in Philadelphia on June 23, 1876, and one entitled “The Evolution of American Rolling Mills,” which he presented as a presidential address before the American Society of Mechanical Engineers on November 16, 1891. These papers contain much information not commonly known regarding the early development of Bessemer rail manufacture.

LOCOMOTIVE COALING PLANTS.—A comprehensive book on locomotive coaling facilities, Rands gravity sand plants and cinder handling equipment for railroads, describing a large number of representative installations, has been published by the Roberts & Schaefer Company, Chicago. The catalogue contains 68 pages, 9 in. by 11 1/2 in., is well illustrated and includes erection drawings of several of the plants. It also describes and illustrates some of the special features of Roberts & Schaefer equipment, including the Schraeder automatic measuring feeder and a patented elevating bucket. Some interesting data is also given showing in detail the cost of handling coal, taken from carefully compiled records of a large railway system which employs 10 different methods of handling coal, comparing the cost of operating plants designed by the Roberts & Schaefer Company with the others.

Railway Construction

DE QUEEN & EASTERN.—This company is connecting a terminus of its road at the Arkansas-Oklahoma state line, about nine miles west of De Queen, Ark., with a line extended from the terminus of the Texas, Oklahoma & Eastern at Broken Bow, Okla. Beginning at a point on the St. Louis-San Francisco at

Valliant, Okla., and extending east through Bismark and Broken Bow, in Okla., and De Queen, Lockesburg and Dierks, in Ark., a link of 76 miles will be built. There remains six miles of grading to be done and 15 miles of steel to lay. Many trestles and one 100-ft. steel span are to be built. The company's forces will carry out the trestle work and at a later date will contract for the steel span.

ANNUAL REPORT

Buffalo, Rochester & Pittsburgh—Thirty-fourth Annual Report

The Directors of the Buffalo, Rochester and Pittsburgh Railway Company submit to the Stockholders the following report for the year ending December 31, 1918.

As stated last year, the U. S. R. R. Administration formally assumed possession, control, operation and use of your property at 12 o'clock noon on December 28, 1917. The actual operation and accounting, however, became effective at midnight of December 31, 1917.

Under authority of a proclamation of the President, dated March 29, 1918, authorizing the Director General of Railroads to agree with the carriers respecting all the terms and conditions of the Federal Control Act, and in accordance with authority given by you at a meeting held July 10, 1918, a contract between the Director General of Railroads and your Company, dated October 25, 1918, was executed on December 19, 1918.

The annual compensation thereby guaranteed to your Company is \$3,276,410.42, payable quarterly in equal installments on the last days of March, June, September and December of each year, and was based entirely on the average annual operating income of your Company during the test period named in the Federal Control Act, being the three years ending June 30, 1917. A claim for additional compensation presented by your Company did not receive favorable consideration.

In assuming control of the property January 1, 1918, the Director General took over the following assets:

Cash	\$1,422,153.48
Agents and conductors balances.....	304,244.60
Material and supplies.....	2,932,330.71
Total	\$4,658,728.79

According to the agreement, out of the amounts received from the Company in cash collected or realized upon by him from current operating assets, he has paid the current operating liabilities of the Company and other claims arising prior to January 1, 1918, and is to account for the balance in the quarterly settlements. At the end of Federal control he is to return materials and supplies equal in quantity, quality and relative usefulness to that of the material and supplies which he received, or account for the same at prices prevailing at that time.

As definite settlements under this contract have not yet begun, the U. S. R. R. Administration advanced from time to time the necessary funds for immediate needs, as follows:

On account of annual compensation.....	\$860,000.00
Loans on notes.....	1,440,000.00
Total	\$2,300,000.00

For your information, and also to maintain the continuity of the statistics, full details of the operation under Federal control so far as available, are given in an appendix to this report.

ROAD			
(Operated by U. S. R. R. Administration)			
	1918	1917	Inc.
Owned	368.31	367.07	1.24
Leased	90.31	89.91	.40
Trackage rights	131.11	127.67	3.44
Total length of road operated	589.73	584.65	5.08
Second track	212.61	210.61	2.00
Sidings	457.48	412.57	44.91
Total miles of tracks, all steel rails	1,259.82	1,207.83	51.99

The increase of road operated is due to an adjustment of 1.64 miles in line owned and leased, caused by remeasurement, and additional trackage rights of 1.24 miles over Pennsylvania Railroad in Pennsylvania, and 2.20 miles over New York Central Railroad at Clearfield, Pa.

The tracks were increased by 2.00 miles of second track, from remeasurement, and 44.91 miles of sidings, including 25.83 miles on lines used under trackage rights.

INCOME.

OPERATING INCOME:	1918.	1917.	INCREASE OR DECREASE.
Revenues	\$14,975,000.30	-\$14,975,000.30	
Expenses	\$52,281.17	11,878,565.89	-\$11,826,284.72
Net revenue	\$52,281.17	\$3,096,434.41	-\$3,148,715.58
Tax accruals	150,000.00	506,000.00	-\$356,000.00
Uncollectible revenues		359.09	-\$359.09
	\$150,000.00	\$506,359.09	-\$356,359.09
Total operating income (Def)	\$202,281.17	\$2,590,075.32	-\$2,792,356.49

NON-OPERATING INCOME:

Guaranteed rental	\$3,276,410.42	\$3,276,410.42
-------------------------	----------------	-------	----------------

Equipment and joint facility			
rental	\$1,183,038.03	-\$1,183,038.03	
Other items	279,207.88	132,963.20	146,244.68
	\$3,555,618.30	\$1,316,001.23	\$2,239,617.07

Gross income

Net income

DEDUCTIONS:

Equipment and joint facility			
rental	\$319,061.15	-\$319,061.15	
Rentals of leased lines, interest, etc.	\$2,205,025.94	1,847,194.91	\$357,831.03
	\$2,205,025.94	\$2,166,256.06	\$38,769.88

Net income

APPROPRIATIONS:

Pension and Fire Insurance			
Funds	\$28,754.45	\$27,360.98	\$1,393.47
Special appropriations	600.29	644,354.25	-\$643,753.96
Total appropriations	\$29,354.74	\$671,715.23	-\$642,360.49

Surplus available for dividends.....

Return on capital stock.....

DIVIDENDS.

1918 1917

Dividends in cash were paid on:

Preferred Stock

Common Stock

Total

Dividends in cash were paid on:

Preferred Stock

Common Stock

Total

Surplus available for dividends.....

Return on capital stock.....

CAPITAL STOCK.

There has been no change during the year in this account. The total outstanding Capital Stock of the Company amounts to \$16,500,000, and consists of \$6,000,000 preferred stock and of \$10,500,000 common stock.

FUNDED DEBT.

In accordance with the provisions of the Consolidated Mortgage of 1907, \$1,500,000 4½% bonds were received from the Trustee to apply on payments made for improvements and betterments, and the securities placed in the Treasury of the Company.

The Trustee also delivered to the Company \$147,000 Consolidated Mortgage 4½% bonds, representing 50% of a part of Equipment Bonds Series E and F retired during the year. The balance of the bonds due will be obtained next year.

These bonds, added to those in the Treasury of the Company, make a total of \$2,970,000 held in reserve.

Under the terms of the Sinking Funds for the redemption of Equipment Bonds, \$724,000 bonds were retired, as follows: \$25,000 Series A; \$50,000 Series B; \$50,000 Series C; \$117,000 Series D; \$116,000 Series E; \$185,000 Series F; and \$181,000 Series G.

Also the fourth annual installment of \$125,000 Series H bonds, and the first and second semi-annual installments of Series J bonds, amounting to \$160,000, were retired, as provided for in the agreements.

To provide for additional rolling stock, an issue of \$1,200,000 six per cent Gold Bonds was authorized, to be secured by new equipment costing \$1,573,600. These bonds were issued under an agreement, known as "Equipment Agreement Series K" dated August 1, 1918, and were sold during the year to the W. S. R. R. Administration. The Agreement provides that both principal and interest are payable without deduction for any tax, or taxes (except any Federal Income Tax) under any present or future law. The bonds mature in semi-annual installments of \$40,000, beginning February 1, 1919, and ending August 1, 1933.

The net result is an increase of \$326,000 in the bonded debt of the Company, held by the public on December 31, 1918.

LOANS.

Pending a more favorable market for the sale of the Company's Consolidated Mortgage Gold Bonds, held in its Treasury, at a fair price, it was found advisable to issue its notes bearing interest at 6% to the amount of \$2,440,000.00 to obtain the necessary funds for corporate purposes.

Further loans of \$250,000.00 were made at 4 1/4% and 4 1/2% to meet the purchase of a similar amount of the Fourth Liberty Loan Bonds, subscribed for by your Company.

Including the loans made in 1917, the short term indebtedness now amounts to \$3,699,600.00.

COST OF ROAD.

Capital account has been charged during the year with \$1,947,756.34 for investment in road, as follows:

Second track, Marion Center, Pa., to Home, Pa.....	\$27,052.96
Passing Siding, etc., West Shore Junction, N. Y.....	11,081.40
Passing Siding, etc., Warsaw, N. Y.....	21,554.98
Passing Siding, etc., Beavers, N. Y.....	52,607.72
Passing Siding, etc., Falls Creek, Pa.....	31,493.06
Passing Siding, etc., Whistletown, Pa.....	29,100.63
Passing Siding, etc., Juneau, Pa.....	27,123.99
Interlocking plat., Riverside Jct., N. Y.....	7,870.93
Interlocking plant, Brockwayville, Pa.....	15,526.54
Interlocking plant, Falls Creek, Pa.....	5,274.71
Interlocking plant, C. & M. Junction, Pa.....	15,487.43
Terminal facilities, Buffalo Creek, N. Y.....	31,441.10
Terminal facilities, East Salamanca, N. Y.....	375,909.21
Terminal facilities, Clarion Junction, Pa.....	26,781.29
Terminal facilities, Du Bois, Pa.....	32,251.74
Terminal facilities, Elk Run Jct., and Cloe, Pa.....	734,003.16
Remodeling freight station, Rochester, N. Y.....	5,530.56
Remodeling freight station, Ganson St., Buffalo, N. Y.....	14,794.00
New station, West Falls, N. Y.....	8,289.57
Tie tamping machines and equipment.....	25,315.81
Shop and power plant machines.....	158,108.21
Improvement bridge, Johnsonburg, Pa.....	19,803.98
Increased weight of rail, etc.....	144,947.36
Stone and slag ballast.....	33,507.80
Additional yard extensions, sidings, etc.....	92,898.26
Total.....	\$1,947,756.34

The program of new work authorized in 1917, including the extensive improvements and changes in the terminal facilities and buildings at East Salamanca, N. Y., and Elk Run Junction and Cloe, Pa., is virtually completed.

The only important work still in progress, to be completed in 1919, is the following:

Land for industrial tracks, Buffalo, N. Y.
Interlocking plants at Riverside Junction, N. Y., and Falls Creek, Pa.
Yard tracks at Falls Creek, Pa.
No further new projects involving large expenditures are required or contemplated at this time.

COST OF EQUIPMENT.

Expenditures were made for additions to equipment as follows:	
Thirty-nine new freight locomotives	\$2,427,777.40
Eight new passenger locomotives	351,006.85
Forty-four steel underframe gondola cars, built at company's shop	47,442.10
Fifteen new caboose cars	42,646.55
Eight locomotive superheaters	14,246.31
Twenty-five incandescent headlights	3,869.14
Thirty-three duplex locomotive stokers	75,279.27
Sundry other additions, including two flanger cars, three tractor plows, re-classification or transfer of ten freight cars to work equipment	33,295.32
	\$2,995,562.94

There was credited for equipment sold, transferred or destroyed, the following book values, of which the accrued depreciation to January 1, 1918, was charged to Accrued Depreciation Account, and the balance to the U. S. R. R. R.

Administration:	
Two freight locomotives	\$23,198.24
Two passenger locomotives	16,792.74
Two passenger train cars	5,494.75
One hundred thirty-seven freight train cars.....	89,151.94
Five work equipment cars	1,443.59
Eight miscellaneous equipment cars	5,289.70
Making a net increase of	141,370.96
	\$2,854,191.98

The total tractive power of engines aggregates 16,025,362 pounds, an increase of 3,251,952 pounds during the past year.

The average tractive power of each engine increased 4,252 pounds, being 43,312 pounds as against 39,060 pounds on December 31, 1917.

The total carrying capacity of cars in freight service now amounts to 777,657 net tons, an increase of 40,330.

The average carrying capacity or efficiency of each freight car increased .57 ton, being 43.94 tons as against 43.37 tons.

Of the cars in passenger service 47.31 per cent are of all steel construction; and in the freight service 93.63 per cent of the cars are all steel or are equipped with steel underframes.

All rolling stock under contract was delivered during the year and is included in this report.

The approximate cost of \$2,253,600.00 for 800 fifty-five ton steel coal cars, allocated to your Company by the U. S. R. R. Administration and accepted from the builders by their inspectors, was not entered upon the books, pending a final determination of the whole question of the railroad equipment problem.

FIRE INSURANCE FUND.

The assets of this fund were increased \$12,292.11 and now amount to \$373,461.65 in interest bearing securities and cash.

PENSION FUND.

The assets of this fund, created July 1, 1903, were increased \$11,611.28, and now amount to \$243,998.69 in interest bearing securities and cash. There were 68 pensioners upon the roll on December 31, 1918, a net increase of 4 during the year.

GENERAL REMARKS.

The Ontario Car Ferry Company, Limited, paid a dividend of 2 1/4% for the six months ending December 31, 1917. The sum of \$6,250.00 received on the \$250,000 of this Company's stock was credited to non-operating income account.

The Interstate Commerce Commission began the valuation of your lines on July 1, 1917. About 95% of the field work, 75% of the office work and 45% of the profiles are completed. The amount expended to date on this account has reached \$95,166.76.

The officers and employees of your Company subscribed to the Liberty Loans of the Government as follows:

1st Liberty Loan.....	3,390 individuals.....	\$275,650.00
2nd " "	1,738 " "	128,250.00
3rd " "	5,544 " "	355,250.00
4th " "	7,567 " "	924,850.00
Total.....	18,239 " "	\$1,684,000.00

of which only \$144,442.34 remains to be paid for in the coming year.

During the war, two of the Directors and 850 employees joined the Nation's military and naval forces, of whom seven received commissions.

The acknowledgments of the Board are renewed to its officers and employees for their faithful and efficient service.

By order of the Board.

WILLIAM T. NOONAN,
President.

Rochester, N. Y., March 6, 1919.

PROFIT AND LOSS ACCOUNT.

December 31, 1918.

CREDIT.

Balance Surplus December 31, 1917.....	\$4,395,242.15
Credit Balance, transferred from Income Account (page 22)	1,118,956.45

MISCELLANEOUS CREDITS—

Adjustment on equipment bonds retired this year, to equalize discount at time of sale.....	\$34,564.46
Unclaimed wages, etc.....	3,693.93
Discount on funded debt retired...	5,172.65
Profit from securities bought and sold—	
Pension Fund	\$879.00
Insurance Fund	1,240.00
Sundry items	2,119.00
	65.18
Total.....	45,615.22
	\$5,559,813.82

DEBIT.

Dividend appropriation of surplus:

Preferred stock—	
(No. 49) 3% on \$6,000,000, payable February 15, 1918.....	\$180,000.00
(No. 50) 3% on \$6,000,000, payable August 15, 1918.....	180,000.00

Common stock—

(No. 36) 3% on \$10,500,000, payable February 15, 1918.....	315,000.00
(No. 37) 3% on \$10,500,000, payable August 15, 1918.....	210,000.00

\$885,000.00

Surplus applied to sinking and other reserve funds—

Equipment bonds retired—Series A to G inclusive.....	577,348.68
Miscellaneous appropriation of surplus—	

Series H and J.....	225,000.00
Debt discount extinguished through surplus	944.99

Miscellaneous debits—	
Premium on funded debt retired..	\$3,625.99
Sundry items	1,551.79

5,177.78 1,693,471.48

BY BALANCE SURPLUS December 31, 1918 (page 16)..... \$3,866,342.37

[A.D.]

Railway Officers

Railroad Administration Central

G. W. Tomlinson, director of the Division of Inland Waterways, has been given leave of absence to become resident director at London for the American Shipbuilding Company.

E. Marvin Underwood, general solicitor of the Seaboard Air Line and formerly assistant attorney general of the United States, has been appointed general solicitor of the United States Railroad Administration, and **R. V. Fletcher**, general attorney of the Illinois Central, has been appointed assistant general counsel of the Railroad Administration, in charge of traffic matters, succeeding **R. Walton Moore**, resigned.

Operating

W. Stephenson, assistant superintendent on the St. Louis Southwestern with headquarters at Pine Bluff, Ark., has been promoted to superintendent, with headquarters at the same place, succeeding **J. E. Callahan**, promoted.

J. G. Fitzhugh, superintendent of safety and fire prevention of the Gulf, Colorado & Santa Fe and associated lines, with headquarters at Galveston, Texas, has had his authority extended over the Beaumont, Sour Lake & Western, the Houston Belt & Terminal, the Iberia St. Mary's & Eastern, the New Iberia and Northern, the New Orleans, Texas & Mexico, the Orange & Northwestern and the St. Louis, Brownsville & Mexico.

John P. Darling, who has been appointed superintendent of the Bangor & Aroostook, with headquarters at Houlton, Maine, as has already been announced in these columns, was born on January 25, 1866, at Port Jefferson, N. Y. He began railway work in May, 1883, with the New York, West Shore & Buffalo, now the West Shore, and served in different capacities until the summer of 1885, when he was appointed night operator at Utica, N. Y. In 1888 he served as copier to despatcher and later became trick despatcher. He subsequently served on the same road and the New York Central lines consecutively as despatcher, chief despatcher, examiner and trainmaster, until 1907, when he resigned from railway work on account of ill health. In October, 1909, he entered the service of the Bangor & Aroostook as examiner. The following year he was appointed yardmaster, and later in the same year became trainmaster, which position he held until his recent appointment as superintendent of the same road as above noted.

Financial, Legal and Accounting

Charles Elsey, acting federal treasurer of the Western Pacific, the Tidewater Southern and the Deep Creek, has been promoted to federal treasurer of these roads, with headquarters at San Francisco, Cal.

W. F. Ingram, acting federal treasurer of the Southern Pacific, with headquarters at San Francisco, Cal., has been promoted to federal treasurer of this road and the Arizona Eastern with the same headquarters.

J. Kennedy has been appointed auditor of disbursements of the Southern Pacific and the Arizona Eastern, with headquarters at San Francisco, Cal., vice F. L. McCaffery resigned to accept service with Southern Pacific Company.

James F. Wright, assistant general solicitor of the Seaboard Air Line, with office at Norfolk, Va., has been appointed general solicitor, vice **E. Marvin Underwood**, resigned to become general solicitor for the United States Railroad Administration.

C. H. Hueston, acting federal treasurer and paymaster of the Des Moines Union, the Iowa Transfer, the Des Moines

Western and the Des Moines Terminal has been appointed federal treasurer for these roads, with headquarters at Des Moines, Iowa.

Engineering and Rolling Stock

Philip Petri, until recently district engineer on the Baltimore & Ohio, Eastern Lines, with office at Pittsburgh, Pa., has been appointed division engineer, with headquarters at Cumberland, Md., vice W. T. Hughes, transferred.

Purchasing

R. L. Irwin, purchasing agent of the Gulf, Colorado & Santa Fe and associated lines, with headquarters at Dallas, Texas, has had his authority extended over the Beaumont, Sour Lake & Western, the Houston Belt & Terminal, the Iberia, St. Mary's & Eastern, the New Iberia and Northern, the New Orleans, Texas & Mexico, the Orange & Northwestern and the St. Louis, Brownsville & Mexico.

Corporate

Traffic

M. O. Bicknell, assistant to the president of the Sacramento Northern, has been promoted to traffic manager, with headquarters at San Francisco, Cal., to succeed J. R. Wilson, who has resigned.

Executive, Financial, Legal and Accounting

Colonel Frederick W. Green, having retired from army service, has been reinstated to the office of assistant to the president of the St. Louis Southwestern Railway Company, with office at St. Louis, Mo.

Railway Officers in Military Service

Major Edward W. Mason, 31st Engineers (Railway), American Expeditionary Force, who has been stationed at St. Nazaire, France, since May, 1918, has been promoted to Lieutenant-Colonel and appointed general superintendent of the 14th Grand Division, which extends from Givres to St. Nazaire and La Rochelle, with headquarters at Nantes, France. Mr. Mason was formerly general superintendent of the Western Pacific, with headquarters at San Francisco, Cal. He entered the service of that road in 1909 and served continuously with the Western Pacific until his entry into the service of the United States Army.

Obituary

Harry De Laney, formerly superintendent of motive power of the Chicago, Indianapolis & Louisville, at New Albany, Ind., and later for about six years, previous to 1912, eastern representative at New York for Brown & Company, Inc., manufacturers of iron and steel products, at Pittsburgh, Pa., died at his home in New York on March 30. Mr. De Laney retired from active work in 1912.

David M. Perine, special agent on the personal staff of the general superintendent of the New Jersey division of the Pennsylvania Railroad, with headquarters at New York, died on April 22, at Baltimore, Md., while on a business trip in that city. He was born on February 13, 1869, at Baltimore, Md., and entered the service of the Pennsylvania System in May, 1888, as an apprentice at the Mt. Vernon shops of the Northern Central. He subsequently served consecutively as assistant road foreman of engines, assistant master mechanic, assistant engineer of motive power, and master mechanic until April, 1906, when he was promoted to superintendent of motive power of the Northern Central and the Philadelphia & Erie. The following year he was transferred to Pittsburgh on the Western Pennsylvania division, and in January, 1912, was again transferred to the New Jersey division and the West Jersey & Seashore, remaining in that position until his promotion in June, 1917, as special agent on the personal staff of the general superintendent of the New Jersey division as above noted.